THE IRON TRADE REVIEW

VOLUME XXX. CLEVELAND, O. DECEMBER 23, 1897. CHICAGO, ILL. NUMBER 51

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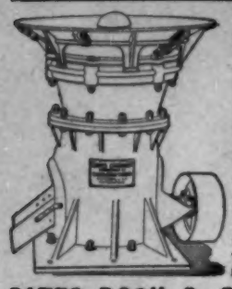

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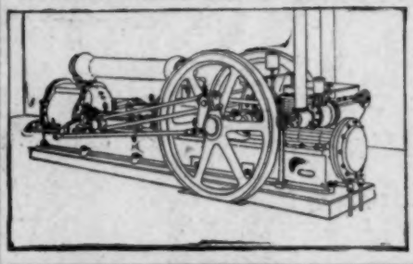

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THE IRON TRADE REVIEW

VOLUME XXX. CLEVELAND, O. DECEMBER 23, 1897. CHICAGO, ILL. NUMBER 51

THE WEEK IN IRON CIRCLES.

The last fortnight of the year is marked by larger buying than is usual on the verge of the holiday and inventory season. Activity has been most marked in intermediate products — billets, sheet and tin plate bars and wire rods—and Central Western steel works and rod mills already have comfortable tonnages booked for first quarter delivery. On billets $15 Pittsburg maker's mill is now minimum and mills quote $15.25. Rail mills have closed further contracts on a basis of $18, Pittsburg district, while $20 is the Chicago quotation on standard sections. Car buying has kept up in a way that promises well for early business in pig iron and bars, Chicago reporting a number of additional orders. Car and locomotive works are more generally occupied than at any time since 1892, with much in the way of new equipment yet to be placed. The unanimity of buyers and sellers in expecting large things of 1898 is unusual in the midst of the quiet preceding the opening of a new year. While the average buyer is not persuaded to contract largely now, the evidence of heavy consumption accumulates to keep producers from the cut prices that have been made to secure January and February tonnage in other years. The figures for pig iron production and stocks Dec. 1 indicate that 1,000,000 tons a month is the present rate of consumption, showing that both the make and the use of iron are now at the highest point ever reached. The market for Bessemer pig iron has not been affected by the large sales of billets and rods. No further sales are reported below $9.50 valley where deliveries go beyond Jan. 1, but offers are under that figure, and on prompt iron it could be shaded. Practically nothing has been done in the past week. For foundry irons there is considerable inquiry and a few buyers have taken lots for the first half of the year. Others were kept from contracting by finding quotations firmer than they had anticipated. Some weak sellers have been found, particularly in the East, where Southern and local irons have come into close competition. In the Central West and in the West prices have been held with little change at $9.50 at valley furnace for No. 2 foundry, with Southern iron still a trifle above Northern in regular competing territory. An advance in Southern freights has been discussed but it is quite certain that nothing will be done except, perhaps, to discontinue some special concessions made in the past six months. Central Traffic Association rates on iron and iron articles will remain unchanged, the traffic managers having reconsidered their recent action making an advance with Jan. 1. This decision is certainly in line with present conditions, since with all the enlarged consumption of iron in the past four months, prices have yielded very modest margins. There is considerable inquiry for finished material, but at the moment no large business. A good amount of structural work is being figured on, and plate mills anticipate a good business early in the year. Bar iron and steel at valley mills have been at the lowest point for six months, but the advance in billets has caused a generally firmer feeling in steel bars the past week. Buyers of sheets have been feeling the market; sellers, however, are not pressing matters. Tin plates have sagged off and in the past week some large contracts have been made with deliveries running into fall. The wire combination is doing as rapidly as may be all that can be done at present, and appraisers and accountants are busy. The heavy business in rods has filled up Central Western mills for most of the first quarter. Pittsburg quotations are $23 to $23.50. The rumors of some months ago of the consolidation of important Central Western interests are renewed with the approach of the new year, when the change would be likely to go into effect, if at all.

THE CLEVELAND DISTRICT.

The figures showing ore shipments for 1897 have been an interesting study to the trade in the past week. They show a gain of 27 in the total over 1896, while the Mesabi range gained 49 per cent on its record for the preceding year. Yet the Mesabi range, with its output of 4,280,000 tons this year, furnished but 35 per cent of the total. Counting in last spring's dock stocks of Mesabi ores, and allowing for unsold Mesabi ore brought down the past season, it is estimated that that range contributed close to one-third of the Lake Superior ores consumed in 1897. There is no pool talk for 1898 as yet, outside of speculation as to the possibility of the Mesabi mines going into an arrangement. The decision of this question is largely in the hands of the Oliver Mining Co.

Pig Iron. Thre has been little actual business through local offices, the past week, so far as Bessemer pig iron is concerned. Some offers from Pittsburg are noted but being below $9.50 for first quarter iron, have not been entertained. The coke price promises to stay closer to $1.75 than some prophets have wanted. We find no authenticated sales below $1.65, and it is now certain that furnacemen will pay from 25 to 40 cents a ton more than in the past six months. This makes some of them quite ready to decline offers even of $9.50. Several inquiries for foundry iron are up, and a local contract for 1,000 tons is pending. Some buying is reported by the local pipe interest. No. 3 foundry is quoted $9.25 Cleveland and gray forge at a shade below $9. The proposed advance on pig iron rates, which would carry an additional 5 cents from the valley to Pittsburg and Cleveland, is not expected to materialize, now that the low rates on iron articles have been left on the 5th and 6th class basis. We quote Cleveland delivery:

Bessemer	10 15	Valley Scotch No. 1	$10 65@10 75
No. 1 Strong Foundry	10 50@10 75	Valley Scotch No. 2	10 25@10 40
No. 2 Strong Foundry	10 15@10 25	Gray Forge	9 00
No. 3 Foundry	9 25	Lake Superior Charcoal	12 00

Finished Material. Wire and wire nail mills are covering their rod requirements for the first quarter and sales have aggregated many thousand tons. The present Cleveland quotation for rods is $23.50 to $24. Wire and wire nails are quiet in the holiday interval and prices are unchanged at $1.20 and $1.40 respectively. The bar mills of the valley have been competing sharply for business, and .95c is a common quotation on large lots, while to a large extent extras are ignored. Sheets are in fair demand and quotations are based on 2.05c, Pittsburg mill, for No. 28, with a firmer tendency. There is no change in beams and channels and plates, the Pittsburg basis of 1.10c and 1c respectively being maintained. Pipes and tubes are held more closely to association figures. Old material is quiet. Old iron rails are quoted $13 to $13.50, and steel rails $10; No. 1 railroad wrought scrap, $10.50.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1142 MONADNOCK BLOCK, Dec. 22.

In most lines the market has been quiet, and has developed no new features. Nearly all buyers are disposed to wait until after the first of the year before placing their contracts, and as a consequence there is very little business being closed at present. A good many consumers are getting prices on material, with the idea of buying soon after the first of the year, and the orders coming in now are nearly all small ones. The railroad business continues large, orders for several thousand cars having been placed in the week with local car builders, and other orders are expected to be placed within a week or two. At Indianapolis the Odd Fellows' Temple will take about 1,300 tons of material, and the Strong building in Chicago will take 850 tons. No other large contracts have come up, and none were placed last week.

PIG IRON.—Consumers have been feeling the market quite a good deal lately, but they have bought very little iron, comparatively. One or two good-sized contracts were placed, but most buyers intend waiting until after the first of the year before making purchases. The number and size of the inquiries received denote a very large business pending, and the furnaces are expecting the new year's buying to open two or three weeks earlier than usual. Foundries are reported to be taking their iron as fast as the furnaces can make shipments, and are not having shipments held up in any cases. The furnaces are very firm in their views. Some reports are heard of low prices being made on Southern irons, but if they have been, it is probable, in view of the attitude of the leading producers, that it was either from smaller furnaces not so well booked or on speculative or warrant iron. The larger furnaces in the South are not at all disposed to make any lower prices than those quoted, and it is believed they are not doing so.

Lake Sup. Charcoal	$12 50@13 00	South'n Coke No. 3	$10 35@10 60
Local Coke Fdy. No. 1	11 00@11 50	Southern No. 1 Soft	10 85@11 25
Local Coke Fdy. No. 2	10 50@11 00	Southern No. 2 Soft	10 60@10 85
Local Coke Fdy. No. 3	10 25@10 50	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 50@11 00	Alabama Car Wheel	16 00@17 00
South'n Coke No. 1	11 00@11 25	Malleable Bessemer	10 75@11 00
South'n Coke No. 2	10 60@10 85	Coke Bessemer	11 50@12 00

BARS.—The principal business comes from car builders, who have taken some good contracts for their product in the week. One or two large orders for bars have been placed, but the bulk of the orders closed were for small lots. Prices are firm, and have not been changed. They are made at 1.05 to 1.10c for common iron, 1.15c to 1.20c for guaranteed, and 1.15c to 1.20c for soft steel bars from strictly billet stock

CAR ORDERS.—The railroads have placed good orders for cars in the week, and further business is expected to come in very soon. The B. & O. contracted for 4,000 cars from the Pullman company, which has also an order for 400 all-steel ore cars from the Duluth, Missabe & Northern. The larger part of the material for these cars will be made by the Pullman company, but some of it has been placed outside. The K. C., P. & G. road is taking figures on 1,000 cars, which are expected to be let this week. The Vandalia Line is figuring on 200 cars. Aside from these several orders for small lots have been placed, and others will be soon.

RAILS AND TRACK SUPPLIES.—The local mills report a good week's business in rails, and expect that the tonnage for 1898 will be fully as large as, if not larger than, it was in 1897. No particulars as to sales can be obtained, but they are undoubtedly large. Quotations on rails have been advanced $1 a ton. Prices are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.20c to 1.30c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts, 1.90c to 2c; spikes, 1.60c to 1.65c.

BILLETS AND RODS.—Sales have been very small in both billets and rods. The local mills are not in the market to sell, being sold up for some time into the future. Quotations are nominal at $17 for billets and $23.50 for rods.

STRUCTURAL MATERIAL.—No large contracts have been placed, and the general business in small lots has not been large. The Odd Fellows' Temple, at Indianapolis, to be let very soon, will take about 1,300 tons of material. Figures are being made on the Strong building, in this city, which will take 850 tons of steel. Prices on material for future delivery are held very strong by the mills. Prices are as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.20c to 1.25c; plates, 1.15c to 1.20c; tees, 1.30c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—Quite a good business has been done, mostly in small lots for immediate shipment. The mills are inclined to be very firm in their views on prices for future deliveries. Quotations are made as follows: Tank steel, 1.15c to 1.20c; flange steel, 1.25c to 1.35c; firebox steel, 1.85c to 5c.

SHEETS.—Business has been very fair, and included some quite good orders, although most of the sales were for small lots. Quotations are made at 2.20c to 2.25c for No. 27 black and 80 and 7½ per cent discount for galvanized.

MERCHANT STEEL.—As a rule sales have been for small quantities, but one or two contracts for large amounts were made last week. Buying is expected to be heavy after the turn of the year, judging from the inquiries received. Prices follow: Open-hearth spring, tire and machinery steel, 1.65c to 1.75c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.45c to 1.50c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

SCRAP.—Very little business was closed last week, and dealers are not looking for much before the middle of January, when sales are expected to improve materially. Dealers' selling prices are given below, but in the absence of transactions most of them are only nominal.

Old iron rails, gross	$12 00@$12 50	Axles, net	$14 00@$14 25
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 00@ 9 25	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	10 50@ 11 25	Axle turnings, net	7 25@ 7 50
Railroad forge, net	11 75@ 12 00	Mixed steel, gross	7 00
Dealer's forge, net	9 00@ 9 50	Stove plates, net	6 00@ 6 25
No. 1 mill, net	8 00@ 8 50	Heavy melting steel, gr.	8 00@ 8 25
Heavy cast, net	7 75@ 8 25	Old iron splice b., net	13 25@ 13 75
Malleable cast, net	8 00@ 8 50		

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, DEC. 22.

The week has been quiet, closing up for the year having begun in some quarters. For 1898 inquiry is still very heavy and in almost every branch the outlook is bright for a large tonnage soon after Jan. 1.

PIG IRON.—There has been little buying of Bessemer since the purchase of prompt iron last week and little inclination is shown either to buy or sell. The market is quoted in a general way at $9.50 valley for three months of next year, with prompt iron offered at lower figures. Connellsville coke is firmly held, $1.65 being the lowest point touched of late on standard furnace coke. Sales are not being made very far into next year. Gray forge is stronger than would be indicated by the rumors of sales below $9, and several thousand tons have sold in the week at $9 Pittsburg. One furnace refuses for the present to sell further.

Bessemer, valley Dec-Feb	$ 9.50
Bessemer delivered Pittsburg District	10.00 to 10.15
No. 1 Foundry	10.75 to 10.90
No. 2 Foundry	10.25 to 10.40
No. 3 Foundry	10.00
Gray Forge	9.00

BILLETS.—Buying of billets, sheet bars and rods has continued during the week, sales for the most part running over the first quarter. While speculation figured in some earlier purchases those of the last week have been mainly to consumers. Billets are very firm at $15 and the quotations of mills are above this figure. Sheet bars have been in heavy inquiry, especially from Eastern buyers, and sales are reported from $17 to $17.25. Rods are somewhat easier and are quoted at $23.

STRUCTURAL MATERIAL.—Work for next year is coming in large quantities for estimates and for this reason mails are heavy. The developments of the week in New York make the underground work a more probable enterprise than it has been so far, and local interest is aroused over the 55,000 tons of girders, columns and plates that will be needed. Both local mills will probably bid, if the work develops. Of present business the largest order closed is the 5,000 tons of shapes for the Hall of Records, New York, which was awarded Pittsburg. The revival of the beam pool is regarded here as unlikely, and beams are unchanged at 1.10c. Universal plates are quoted at 1.05c; tees and zees, 1.20c; angles, 1.10c.

PIPES AND TUBES.—Mills report that the jobbing trade is reduced almost to inactivity and stocks will probably stand in this shape till inventories are taken. Merchant pipe is accor-

dingly very weak and out of proportion to oil country goods and boiler tubes, both of which are very active and are bringing strictly associaton discounts. We quote the association discounts which, on merchant pipe, are now subject to a further discount of from 5 to 10 per cent. Butt weld black, 72 per cent off; lap weld black, 78 per cent off; butt weld galvanized, 67 per cent off; lap weld galvanized, 70 per cent off. The second discount is 10 per cent on car load lots. Discounts on merchant boiler tubes are as follows: 2¼-inch and smaller, 72½ per cent off; 2½-inch and larger, 75 per cent off.

Railroad and Track Materials.—Some good-sized rail contracts are pending which may be closed in the next few days. On standard sections $18 is quoted for the first three months of 1898. The girder rail mill at the Edgar Thomson works is now expected to begin rolling soon after Jan. 1. On track material we quote: Iron track bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.15c to 1.20c.

Sheets.—The sheet market is conspicuous for the large volume of inquiries afloat and the general disinclination to sell ahead. A change is noted in Eastern buyers, who are showing more eagerness to get under cover, and would buy for next year were it possible. Some good-sized lots have come up in the week and are still pending. Light gauges are quoted with No. 28 at 2.05c, base. Black plates for tinning are quoted at 2.25c.

Tin Plate.—Three large contracts have been pending during the week and one for 60,000 boxes was closed. Prices are lower than those ruling in the buying of last fall and 100-lb. cokes at mill are quoted at $2.90, with $3 05 to $3.15 ruling in the Eastern markets. In tin plate also is seen a general disinclination to sell far ahead.

Spelter.—Spelter is quiet again and sales are light. Quotations are made at $3 70 to $3.75.

Bars.—Steel bars are higher and while .95c might have been done a week ago, 1c is a firm minimum now. Inquiries for bars for next year have been heavy during the week, some large individual inquiries being included. Iron is no firmer, .92½c to .95c being quoted on common in the valleys and 1c to 1.05c in Pittsburg. Branded all-muck bars are selling at 1.25c to 1.35c.

Iron and Steel Skelp.—Skelp is quoted as follows: Grooved steel skelp, 95c to 97½c; sheared steel skelp, 1.02½c to 1.05c; grooved iron skelp, 1.10c to 1.12½c; sheared iron skelp, 1.17½c to 1.20c.

Old Material. — Contrary to some expectations a livelier steel market has not aroused scrap. In one instance an offer of $12.50 was made for old iron rails but more was refused. A valley sale is reported at $14 for 500 tons and a sale of old steel rails is reported at $10.50. Wrought scrap has brought $11 net, of late, and a sale of car wheels at $10 gross is reported. Cast scrap is quoted at $9 gross.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Cincinnati One of the large Eastern consumers of Southern iron thought the time opportune to cover for requirements during the early part of 1898, and closed for 5,000 tons. An Ohio consumer, who inquired for 12,000 tons, delivery through the first half of 1898, reports that purchases cannot be made at figures to meet his views, and he has decided to wait a while. Unexpected firmness in the price of Southern iron is the cause. Another large deal is pending awaiting the result of award of pipe contract. An encouraging feature of the situation is the placing of orders by various railroads for cars. If the present rate of increase in earnings continues, no doubt the railroads will endeavor to meet the requirements of the traffic situation. Both in the South and North the scarcity of cars continues, and only the most important interests can be cared for promptly. The movement of coke and coal in the Virginia and Southern districts is great restricted. In regard to prices, there is a considerable range of quotations by different furnace companies depending on the condition of their order books. Some who have made more of certain grades than was expected, and who did not cover with sufficient orders, have been moving their stocks at lower prices for prompt delivery and cash. The report of continued reduction in stocks during November, in spite of the fact that production is at the highest rate ever attained, shows the enormous consumption of iron now going on. We quote for cash f.o.b Cincinnati: Southern coke, No. 1 foundry, $10; No. 2, $9 75; No. 3, $9.45; gray forge, $9.25; mottled, $9; No. 1 soft, $10; No 2, $9 75; Hanging Rock charcoal, No. 1. $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1, $12.50 to $13; Standard Georgia car wheel, $14.25 to $15.

Buffalo. Few transactions have been consummated during the past week, but considerable interest is being shown in regard to future wants, and there is a disposition to cover ahead at present prices. Local furnaces are well supplied with orders, one interest in particular still finding its hands full to keep up with the requirements of its shipping list. On the whole the condition appears to be better locally than we have observed it at this season of the year for several years. We quote below on the cash basis f.o.b. cars Buffalo: No. 1 foundry, $11 25; No. 2, $10.75; Ohio strong softener, No. 1, $11.75; No. 2, $11.25; Jackson Co. silvery, No. 1, $14; Southern soft, No. 1, $11.75; No. 2, $11.35.

Philadelphia The holiday dullness which is supposed to hang over the iron trade in December is less marked than usual; certainly prices are holding better than ordinarily when both sides of the market are figuring for position. The pig iron statistics strengthen sellers in the relatively firm attitude they have assumed, and as buyers make inquiries, quite a number of them with the evident purpose of contracting, they find prices in most cases higher than they had expected. Very few have made up their minds that this is the time to buy; yet if consumption continues in 1898 on the scale of the closing weeks of 1897, there is considerable business to be done in the near future. Some offers recently made by newly started interior furnaces and by certain Alabama sellers are at lower prices than prevailed in November, but these have not stimulated business; and evidently the majority of buyers are waiting to see values actually move on the up grade before taking hold. Usual quotations on seaboard deliveries are on the following basis: No. 1 X foundry, $12 to $12.25; No. 2 X foundry, $11.25 to $11.50; No. 2 plain, $10.75 to $11; standard mill iron, $10.50; ordinary mill iron, $10.25; basic iron, $11 to $11.25. The advance in steel in the Pittsburg market has been attended with correspondingly firmer prices here, and while $17 was talked last week, it is probable that $17.25 is the lowest that would be accepted today on ordinary lots for the first three months of 1898. There is considerable business pending, with the feeling more generally in favor of the seller. The market for finished material is not particularly active, and prices are irregular within certain narrow limits, for no considerable weakness has developed anywhere. With billets higher there is a firmer tone on steel bars. In plates and structural steel some business was done last week for Detroit and Bath, Me., shipyards, aggregating 3,000 tons. We quote refined bar iron at 1.10c; steel bars at 1.12½c to 1.15c; tank plates, 1.15c; angles, 1.15c to 1.20c; beams and channels, 1.20c to 1 30c. Buyers of old material appear to be out of the market, except for immediate requirements or where some special concession is offered.

Among recent sales of cupolas the Whiting Foundry Equipment Co., Harvey, Ill., report: McCormick Harvesting Machine Co., Chicago, two No. 9's; Edward P. Allis Co., Milwaukee, one No. 8; Niles Tool Works, Hamilton, one No. 10; Pullman's Palace Car Co., Chicago, one No. 2. Air hoists have been sold to Yarrow & Co., Eng.; Colorado Iron Works, Denver, and Hansell-Elcock Foundry Co , Chicago.

The Riter-Conley Co., of Pittsburg, has been awarded the contract for the erection of a new steel building for the Anniston Pipe & Foundry Co., of Anniston, Ala. The mill will be 450 feet long by 80 feet wide and will cost $50,000.

The water pipe recently contracted for by the city of Chicago with the Addystone Pipe & Steel Co., of Cincinnati, is claimed to be defective in quality, although it has passed an inspection by the Pittsburg Testing Laboratory, and is being held pending an investigation by the city officals. The total amount of the contract is over $600,000. The matter will undoubtedly be settled in a few days. As yet none of the pipe has been put underground.

THE IRON TRADE REVIEW

DEVOTED TO IRON AND STEEL MANUFACTURE, FOUNDRY AND MACHINERY TRADES.

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ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

DECEMBER 23, 1897.

Wage advances are one of the best indications of improved conditions; and those that have come in the iron industry in the past month are especially significant, in view of the general agreement that the iron and steel trades have got beyond the point of any considerable price fluctuations. Beginning with a 10 per cent advance by the Minnesota Iron Co., at its Minnesota and Chandler mines, the movement has included a similar increase at mines on the Menominee range, with the expectation that an announcement will be made soon, of a higher schedule for the Marquette range. Though the fall advance in pig iron has slipped away meantime, a 10 per cent increase in wages at blast furnaces in the Mahoning and Shenango valleys has gone into effect and at the Jones & Laughlins mills at Pittsburg, day workmen, who compose the greater number of employes, have had a restoration of the 10 per cent taken from their wages in the early summer. What is of greater value both to tonnage men and day employes, in all the rolling mills and steel works of the country, the steadiness with which plants have been operated in 1897 has made it the best year for wage-earners in iron and steel since 1892. What is encouraging for the coming year, is that a share of the European money that the railroads and the farmers of the country have been and are now dividing, from the harvests of this phenomenal year, are to go one step further along the line in 1898 and pass into the hands of the steel masters and the steel workers of the country in 1898.

THERE is an incentive for persistently following up all the pioneering in foreign markets by American manufacturers, in the determination of foreign manufacturers to resist every effort to extend our markets. The failure of the Pencoyd Iron Works, of Pencoyd, Pa., to get the contract for the bridge over the River Yssel, in the Netherlands, though their bid was $4,000 lower than the lowest from European bidders, illustrates the sort of opposition that will be encountered. European countries may be expected to make common cause against American products, as the latter give signs of becoming an increasing menace to foreign producers. Steps recently taken in Germany to cut off imports of American machinery and steel products give some indication of the organized resistance that will be met. British and Continental manufacturers appear to recognize the title of the United States to a certain amount of trade in neutral markets, but it may be expected that vigorous efforts will be put forth to lay an embargo on our manufacturers in the countries that have made a record as producers, or that, as in the case of Russia, seek to build up an iron industry of their own. This condition makes it the more imperative that American manufacturers persist in the work that has been so well begun. There are some among our own captains of industry who are skeptical of the willingness of American manufacturers to stick to exports, under more tempting prices at home. And the case is cited of one firm that has sent abroad considerable steel, putting up its price and showing indifference to foreign business, when the improvement in home prices came in early fall. It can easily be seen that under the double pressure of attractive demand at home and organized opposition abroad, a halt might come in the outward movement. While the American record of wide fluctuations in price and the American habit of cultivating the home market might suggest that our foreign business would be allowed to suffer under the conditions named, there is no warrant for the expectation that our manufacturers will be relieved for any length of time, of the necessity of marketing a share of their product abroad. That necessity will be the deciding factor, after all; and in the transition to a career of large outside operations, all present indications point to a continuing level of moderate prices, that will put no wide difference between the profits of the trade abroad and that at home.

THE Western promoters of the American Steel & Wire Co. have made a statement to the public through a Chicago dispatch to the Associated Press. It indicates a desire to conciliate rather than to antagonize public sentiment. In the main the purpose of the combination is outlined, as already indicated in these columns. At the outset the Chicago promoters say that "with the view of largely increasing the export trade in wire, wire nails and other products, and also materially reducing the cost of their manufacture and sale, certain gentlemen who for many years have been identified with and successful in the business, have decided, after a careful study of the situation, to organize a new corporation which will immediately engage in these lines, and will also acquire, by purchase, the properties of the leading manufacturers of wire throughout the United States." The details concerning appraisement and accounting, now in hand, are then referred to, and the belief is expressed that the reports of the experts will justify fully the prices which have been named already by the concerns whose plants are to be taken. This corroborates our statement that the intention appears to be to

deal liberally with all whose properties are sought. The statement says further that there are some smaller concerns, desirous of selling out, whose plants will probably be taken, if offered at fair prices; that it is not proposed to antagonize the interests of any other manufacturers in any respect, nor to increase the manufacture of steel billets, nor to increase prices of wire and wire nails to the consumer. In conclusion it is stated that the new company will be managed economically and that the large increase in manufacture and trade is expected to cheapen production and result in fair profits. Confidence is expressed that the United States can obtain and hold the big foreign trade now enjoyed by some other countries; but that this can be done "only by manufacturing in unison and on such a large scale as will reduce the cost of production." This is putting the case in its best light, and if all phases of the proposed regime not touched upon in the statement were as satisfactory as those to which prominence is given, there would be little to prevent a successful career for the American Steel & Wire Co. The confidence of those who are pushing forward the preliminaries, that the proposed combination will be effected, is shared in large measure by some who do not expect to have official places made for them in the new organization. Estimates on the construction of new rod, wire and wire nail plants have been asked within the past month by men who will be displaced in the doubling up process, and who, knowing no other business, are canvassing costs with a view to manufacturing independently of the combination. It would be mere guess-work to speak as to the amount of new competition the new corporation would encounter; but it is to be considered, at least, that any new plants built would have the chance to incorporate every modern contrivance not acquired by the combine, and that the control of all patents and appliances connected with rod, wire and wire nail mills is a larger undertaking than any single corporation could hope to compass.

German and American Foundry Practice.

TO THE EDITOR:

Dr. Richard Moldenke's translation of Dr. Wuest's able paper read before the German Foundrymen's Association, given in your last three issues, is extremely interesting. It shows that the Germans are alive to progress and to the acceptance of chemistry in founding; and its advocates in this country should feel encouraged that such support is being given abroad to this advance step. Dr. Wuest's paper covers much recent research and confirms views and experiences of the writer. One point covered is that debated at the Cincinnati meeting of the W. F. A. last October, where it was claimed that the first meltings of a cupola give the softer iron, a uniform mixture having been charged. The writer held the contrary view, and is supported by Dr. Wuest. Another feature I would call attention to in Dr. Wuest's paper is the demonstration that carbon is greatly increased in iron by being remelted in contact with fuel. This, readers of my Cincinnati paper will remember, was demonstrated very fully by an elaborate series of experiments.

Dr. Wuest also confirms the writer's experiments showing the impracticability of remelting steel with a view to obtaining thereby castings of a similar character. His treatment of the impracticability of judging iron by fracture is something that might well be read by those who still believe they can tell the composition of pig iron by fracture.

The amount of labor expended in securing the 120 samples of castings shown in Dr. Wuest's paper to determine their chemical and physical qualities, exhibits an enthusiasm in the search for knowledge that is highly commendable. It is to be regretted that the Doctor did not have complete analyses of the 120 samples. Had he done so he would have found the sulphur and phosphorus, as well as the silicon and manganese, affecting the physical qualities of his casting. I think perhaps he has laid too much stress upon silicon and manganese, in assigning the responsibility for so much difference in the physical qualities. But then to obtain analyses costs money. We should feel grateful that Dr. Wuest has gone as far as he has, and for one I hope that more may be heard from him.

THOMAS D. WEST.

Sheet Manufacturers' Meeting.

(Special Telegram.)

PITTSBURG, PA., Dec. 22.—Twenty-four members of the Iron and Steel Sheet Manufacturers' Association met here Tuesday, by call, for consultation. Reports showed heavy inquiry with good present demand and little trouble in getting better prices than those ruling during the fall. It also appeared that the operations of mills in the last six months, two interests excepted, were the heaviest in their history and that stocks are now low. No price schedule was fixed but 2.10c for No. 28 was informally accepted as the basis. Questions growing out of selling through agences were also discussed.

THE Pennsylvania Car Wheel Co., of Pittsburg, capital $100,000, was organized in Pittsburg, Dec. 20. From 300 to 500 car wheels a day will be turned out. The stockholders elected Joshua W. Rhodes, president; Wm. L. Elkins, vice-president; Chas. W. Slocum, secretary and treasurer, and A. W. Slocum, superintendent.

NEARLY all the departments of the Homestead Steel Works were closed Dec. 19, to remain closed until after Jan. 1. The 33-inch mill is being changed this week into a girder rail mill, and in the 40-inch mill five soaking pits will be added and other improvements made. The 119-inch, 32-inch and 28-inch mills will be closed from Dec. 23 to 27. In the coming week the 1898 wage scale for the Homestead works will be arranged.

A TEST was made recently for the Ohio Iron and Steel Co., of Lowellville, of the Wheeler patent vertical water tube boiler recently installed at the plant by the Sharon Boiler Works, Ltd. The test was satisfactory and although rated as a 325 horse-power boiler there was actually developed 602.9 horse-power. Pounds of water evaporated per hour, actual condition, 18,087; from and at 212°, 19,360. Horse power developed from and at 212°, 645.33; horse power by centennial rating, 561.10. Square feet of water heating surface per horse power, actual condition, 4.84; centennial rating, 5.15. Pounds of water evaporated per hour per square foot of water heating surface, actual, 6.2; from and at 212°, 6.7. Average steam pressure, 91 pounds. Average temperature of feed water, 181°.

THE plant of the Falls Rivet & Machine Co., Cuyahoga Falls, O., which went into the hands of a receiver two years ago, was sold Dec. 21 for $202,000. George G. Allen, representing the creditors' committee, bid it in. Reorganization will take place. The company manufactured pulleys, friction clutches and other transmission machinery.

THE *Bulletin* says that the production of pig iron in the United States in 1897 will be not far below 10,000,000 tons, the largest yet attained, and that German production for this year will be the largest ever reached, as also probably that of Great Britain.

PRESIDENT Charles M. Schwab, of the Carnegie Steel Co., Ltd., was given a complimentary dinner at the Hotel Henry, Pittsburg, last Saturday night by the heads of the operating departments of the company. There were 25 persons present, all connected with the company.

AN office of the Bureau of American Republics has been opened in Pittsburg, and is in charge of J. C. Read, of the Holland Co., Fifth ave.

LAKE SUPERIOR IRON MINES.

In view of the prominence given to the relative ore tonnage of the Duluth & Iron Range and the Duluth, Missabe & Northern roads, in the meetings preliminary to the organization of the Bessemer ore pool last March, the figures for 1897 business on the two lines are interesting. It will be seen that the Duluth & Iron Range made a gain of about 840,000 tons over last year's traffic, and that this increase was largely from the Minnesota Iron Co.'s mines on the Mesabi range. The Duluth, Missabe & Northern Roads led in tonnage in 1896, but this year the positions are reversed. Below is given a statement of ore tonnage over the two lines from 1893 when they first entered the Mesabi range. It will appear that the Duluth & Iron Range Road's dependence is on the ores of the Minnesota Iron Co., while the Consolidated Co. is much more of an ore carrier than an ore miner. On this difference in interest will hinge the important questions that will come up in connection with any effort to include Mesabi mines in a Bessemer ore agreement for 1898:

1893.—GROSS TONS.

	Ore Hauled.	Minn. I. Co. Ores.	Consolidated Co. Ores.	Other Ores.
Duluth and Iron Range	903,329	{ V. 806,233 / M. 24,416 }	.....	72,680
Duluth, Mes. and Northern	440,292	.....	119 818	320,474

1894.—GROSS TONS.

Duluth and Iron Range	1,373,253	{ V. 948 513 / M. 361,062 }	.....	63,678
Duluth, Mes. and Northern	1 361 043	.....	575,580	785,463

1895.—GROSS TONS.

Duluth and Iron Range	2,142,572	{ V. 1,037,760 / M. 965 820 }	.....	138,992
Duluth, Mes. and Northern	1,598,783	.....	488,538	1,110,245

1896.—GROSS TONS.

Duluth and Iron Range	1,813,992	{ V. 920.252 / M. 491,043 }	.....	402,697
Duluth, Mes. and Northern	1,988 932	.....	444,242	1,544,690

1897.—GROSS TONS.

Duluth and Iron Range	2,651,465	{ V. 1,030,561 / M. 1,228,793 }	.....	392,111
Duluth, Mes. and Northern	2,376,064	....	483,064	1,893,000

The recent meeting of union miners at Ishpeming, Mich., called by the union officers was attended by about 300 men. A preliminary ballot was in favor of a strike for 15 per cent advance, but this action was reversed later in the meeting. It was then decided to submit the question to a secret ballot of all the members. It is now announced that this ballot, which has been in progress for several days, resulted in an overwhelming majority against a strike. It would not be surprising if the men found the time opportune for disposing of the officers who have led them from one blunder into another. Meanwhile the mining companies are about ready to announce the advanced schedule of wages for the new year.

A party of Illinois Steel Co. officials, including Messrs. Gates, Foote and Palmer, visited the Menominee range last week, inspecting mines in which the company is interested.

The Cleveland-Cliffs Iron Co. has appointed James H. Rough, of Negaunee, superintendent of its Cliffs shaft property at Ishpeming.

The Traders' mine at Iron Mountain, will be operated hereafter for the Antoine Iron Co., by Oglebay, Norton & Co. O. C. Davidson, manager of the Commonwealth and the Aragon mines, is now in charge, succeeding John T. Jones.

In the figures for iron ore shipments from Lake Superior mines, given in our last issue, it appeared that 2,094,739 gross tons of ore shipped from upper lake ports did not come to Lake Erie. Of this amount, as indicated by official figures just received, 1,897,018 tons went to the South Chicago, North Chicago and Bay View furnaces of the Illinois Steel Co., and to the Iroquois Furnace Co.'s docks, leaving 197,721 tons that was shipped by water to charcoal furnaces in Wisconsin and Michigan.

A YOUNGSTOWN, O. dispatch says that at the annual meeting of the Ohio Steel Co. in January action will be taken on a proposition to increase the capital stock of the company from $1,500,000 to $3,000,000, the additional capital to be used for the erection of blast furnaces.

THE Pennsylvania Co. will spend $50,000 in improvements at its Erie, Pa., docks before the opening of next season.

CONDITION OF BLAST FURNACES OF U. S.*

Dec. 1, 1897.

Location of Furnaces.	Coke and Anthracite					Charcoal.				
	Total No. of Stacks.	In Blast.		Out of Blast.		Total No. of Stacks.	In Blast.		Out of Blast.	
		Number.	Weekly capacity.	Number.	Weekly capacity.		Number.	Weekly capacity.	Number.	Weekly capacity.
New York	18	5	6186	13	6312	5	1	100	4	448
New Jersey	5	2	1890	3	1327	.....	.....	.....	.....	.....
Spiegel	3	2	449	1	100	.....	.....	.....	.....	.....
Pennsylvania:						13	1	55	12	695
Lehigh Valley	37	9	5013	28	12470	.....	.....	.....	.....	.....
Spiegel	1	0	0	1	70	.....	.....	.....	.....	.....
Schuylkill Valley	18	5	3406	13	7728	.....	.....	.....	.....	.....
Upper Susqu. Val.	5	2	2059	3	1780	.....	.....	.....	.....	.....
Lower Susqu. Val.	9	4	4292	5	3102	.....	.....	.....	.....	.....
Spiegel	1	1	323	0	0	.....	.....	.....	.....	.....
Lebanon Valley	12	4	2928	8	4484	.....	.....	.....	.....	.....
Pittsburgh	28	28	59524	0	0	.....	.....	.....	.....	.....
Spiegel	2	2	2336	0	0	.....	.....	.....	.....	.....
Shenango Valley	17	11	15682	6	3360	.....	.....	.....	.....	.....
Jun. and Con. Vals.	14	5	8369	9	4036	.....	.....	.....	.....	.....
Spiegel	1	1	768	0	0	.....	.....	.....	.....	.....
Youghiogheny Val.	3	1	1337	2	1900	.....	.....	.....	.....	.....
Miscellaneous	5	2	2,83	3	1789	.....	.....	.....	.....	.....
Maryland	5	3	4484	2	1760	4	1	146	3	428
Wheeling District	9	7	8340	2	3175	.....	.....	.....	.....	.....
Ohio:						9	3	170	6	560
Mahoning Valley	11	10	14893	1	800	.....	.....	.....	.....	.....
Central & Northern	11	10	14253	1	1165	.....	.....	.....	.....	.....
Hocking Valley	2	0	0	2	850	.....	.....	.....	.....	.....
Hanging Rock	12	6	2227	6	1415	.....	.....	.....	.....	.....
Indiana	1	0	0	1	130	.....	.....	.....	.....	.....
Illinois	16	12	22808	4	4900	.....	.....	.....	.....	.....
Spiegel	1	1	752	0	0	.....	.....	.....	.....	.....
Minnesota	1	0	0	1	629	.....	.....	.....	.....	.....
Wisconsin	4	3	3116	1	770	2	0	0	2	920
Missouri	3	1	1000	2	700	1	1	430	0	0
Colorado	3	1	1000	2	3640	.....	.....	.....	.....	.....
Virginia	22	9	6411	13	7312	4	0	0	4	417
Kentucky	6	2	612	4	2650	3	0	0	3	200
Alabama	39	18	10906	21	13600	13	3	956	10	2240
Michigan	.....	.....	.....	.....	.....	15	5	2309	10	3640
Tennessee	13	5	4216	8	4109	9	2	42	7	2200
Georgia	2	0	0	2	960	3	1	315	2	360
North Carolina	2	0	0	2	600	.....	.....	.....	.....	.....
New England	.....	.....	.....	.....	.....	11	2	155	9	858
Texas	.....	.....	.....	.....	.....	4	0	0	4	970
Utah	.....	.....	.....	.....	.....	1	0	0	1	175
Oregon	.....	.....	.....	.....	.....	1	0	0	1	275
Totals	342	172	220963	170	97503	97	19	5061	78	14406

SUMMARY.

Fuel.	In Blast.					Out of Blast.			
	Number.			Weekly Capacity.			Number.	Weekly Capacity.	
		Month Previous.	Year Previous.		Month Previous.	Year Previous.		Month Previous.	
Charcoal	19	19	19	5,061	4,656	5,182	78	78	14,406	14,809
Coke and Anthracite	172	164	128	220,963	208,503	137,096	170	178	97,503	103,663
Total	191	183	147	226,024	213,159	142,278	248	256	111,909	118,472

*The above table is condensed from the *Iron Age*. The tables of the *American Manufacturer* show in blast Dec. 1, 195 furnaces, with 229,703 tons weekly capacity instead of 226,024 as above.

OWING to its increasing business, and to more fully and satisfactorily accommodate its trade, the I. W. Bollinger Co., Western sales agent for Wm. Clark's Son & Co., Pittsburg, Pa.; Terre Haute Iron & Steel Co. and Wabash Iron Co., Terre Haute, Ind.; McCool Tube Co., Beaver Falls, Pa., and Champion Rivet Co., Cleveland, will remove on Jan. 1 from its present office in The Rookery, Chicago, to 133 and 135 South Clinton street, between Adams and Monroe streets. The company will have an office and warehouse at the new location, and will carry for the McCool Tube Co., for whom it is general sales agent, a large and complete assortment of McCool's seamless steel cycle tubing and for the Champion Rivet Co. a complete assortment of the Victor steel boiler and Paragon structural rivets. The company is composed of I. W. Bollinger, who for three years and prior to January last was interested in and manager of the Manufacturers' and Merchants' Warehouse; W. A. Roome, formerly in charge of the sales of boiler and tank plate for the Illinois Steel Co., and H. S. McCool, who has just started his business career. The concerns represented by the company are all well known and prominent in their several lines.

THE blast furnace workers at the Bellaire Steel Works, Bellaire, O., have been granted a 10 per cent increase in wages.

UNIFORMITY IN TESTING CAST IRON.

BY P. KREUZPOINTNER.

Success or failure in the management of industries, singly or collectively, depends on the intimate knowledge of the details pertaining to such industries and their judicious application in every day practice. This truism applies to our iron and steel industries with particular force because the product of mill, furnace and foundry varies necessarily in quality from day to day, and to know how to control the details producing these variations in quality is an essential factor in the endeavor to succeed. One of these details in every day mill, furnace and foundry work is to ascertain the quality of the material produced, no matter whether it has to fill specifications or not.

But, however much the qualities of all kinds of forged, rolled or cast iron and steel may vary, these qualities are all governed by the same properties, characteristic of metals; and whatever difference there is of these properties in different kinds of irons and steels, such difference is only one of degree and not of kind. Hence, if A, B, C, and D are engaged in the same business, and each one tests the product of his work by a different method, then one only can be right and the others are wrong; or perchance all four are wrong, if it happens that each one has a misleading method Now it may appear to the superficial observer that it is a good thing for the one out of four concerns to have the right method and the other three to go wrong. This is the narrow and egotistic view of the matter. The broader view is that, since the other three will worry along in a fashion, upset prices, disarrange the market, waste our resources, and make the product dearer than it would be if all four had the right method, as a consequence a smaller number of consumers only can afford to buy the product. And the one with the right method, after all, may not have much pecuniary advantage over the others.

Markets, new markets for our ever-increasing production, is the battle-cry nowadays. But markets do not wait outside the office door to step in and fill the books with orders. They are like coy maidens who want to be judiciously coaxed and conquered; only, in the case of coy maidens, the procedure to conquer is different from the attempt to create markets or conquer them if they exist. Lowering of cost and increase of quality are the two factors which bring the enlargement of markets, other things being equal. Uniform methods for ascertaining the qualities of the raw materials used, as well as the finished product, are one of the essentials to do away with certain vexations and waste of substance in our metal industries.

Dr. R. Moldenke's paper read at the meeting of the Pittsburg Foundrymen's Association recently, and Mr. A. E. Outerbridge's comments on the same in *The Iron Trade Review*, therefore strike a responsive chord at the present time. Nationally and individually we are in a period of transition, from a time when we could waste our national resources with impunity and do things largely by thumb-rule and guesswork, to a future time when small economies will be the watchword of every industry even more than now, and when scientific methods will rule over pots and kettles, over furnaces and cupolas to a large extent. We have uniform weights and measures, uniform postage, uniformity in many things; why should we not have uniform methods of measuring strength, of which there is but one kind, and ductility, of which also there is but one kind. Now, if the properties of metals would show up alike under all kinds of methods it would not matter; but unfortunately this is not the case. The properties of metals refuse to be squeezed into the straightjacket of conventional rules, formulas or methods. They have a way of their own, and those who do not go with them are unceremoniously left behind. Take, for instance, eight pieces of structural steel and prepare each piece with a different test section. Turn a semicircular groove in one and let it be one inch in diameter at the bottom. Turn the next section one inch long between shoulders with the same diameter, and so on until the last test piece has a section of eight inches between shoulders by one inch in diameter. In practice, however, test sections are made longer by from one-half inch in a 2-inch section to 1½ inch in an 8-inch section, so that measurements between shoulders are 2½ and 9½ inches respectively; and what is called a 2, 4, 6 or 8-inch section means that elongation is measured on a length of 2, 4, 6 or 8 inches, irrespective of the distance between shoulders. If these eight pieces are now broken on a testing machine there will be varying results and the difference between the grooved section and the 8-inch section will be from 12,000 to 14,000 pounds per square inch in strength, while the elongation will vary about 25 per cent. Both strength and elongation will be highest in the grooved sections and lowest in the 8-inch section.

In regard to cast iron the writer ventures to say that the average results of tests of a large number of test pieces, made from the same mixture and ladle, would vary probably some 9,000 pounds between sections 1 inch in diameter and 2 and 8 inches long respectively. These are indisputable facts and have been proved over and over.

The results of tests follow certain laws, and if we do not follow these laws we get erroneous results and are misled. There is no getting over, under or around it. Hence we must study these laws, we must study the nature of iron and steel so that we may understand their peculiarities. If a transverse test of cast iron is the one showing its qualities to best advantage, we should all use a transverse test piece of the same dimensions. If it is a tensile test that is preferable, then all should make tensile tests with pieces of uniform dimens ons, these dimensions being such as to give the metal we test the best chance to stretch and break according to its nature and not according to our preconceived notions or conveniences.

Generally speaking, the largest test piece practicable should be used to get the best; that is, the most reliable, results. Much time and money, energy and resources, have been lost in the past from failure to follow these principles. Fortunately, in the International Union for the Unification of Methods of Testing of materials of Construction we may find the means to bring about the desired uniformity, if there is intelligent co-operation of all interested in the subject.

Obituary.

DR. CARL OTTO.

Dr. Carl Otto, the famous German coke oven builder and head of the well-known fire brick manufacturing concern of Dr. C. Otto & Co., of Dahlhausen-on-Ruhr, died on Nov. 13 at Ahrweiler, Germany, in his 60th year. He was born in 1838 at Jalapa, Mexico, his father having fled thither with his family to escape the vengeance of the despotism then ruling Germany, and which he had offended. After the death of his father at the hands of Mexican brigands, his mother returned with her two sons to Germany, where young Otto received an academic education. After filling leading positions as chemist with several prominent manufacturing concerns, he established a fire brick factory under the name of Dr. C. Otto & Co., at Dahlhausen-on-Rhur. The construction of coke ovens and by-product plants became the specialty of the company, which since 1876 has erected no less than 9,922 coke ovens in Germany alone. Dr. Otto was a member of the German Iron Masters' Association and the president of the Association of German Fire Brick Manufacturers.

J. W. VANDERVOORT.

John Wesley Vandervort, a member of the Carnegie Steel Co., Ltd., died of consumption in Pasadena, Cal., December 16, at the age of 60. He was a native of Pittsburg and for most of his life was connected with iron and steel interests there. The firm Carnegie, Kloman & Co. was formed by Andrew and Thomas Carnegie, Henry Phipps, Andrew Kloman and Mr. Vandervort and the connection of the last-named with the Carnegie interests has continued since. At different times he was treasurer and general manager of the Union mills and treasurer of the Keystone Bridge Works. His health failing, he removed in 1885 to California, where he has since resided.

JACOB GRAAF.

Jacob Graaf died at Blairsville, Pa., last Thursday, Dec. 16, aged 63. He was the principal owner and general manager of the Blairsville Rolling Mill & Tin Plate Co., and was one of the first steel manufacturers to venture into the manufacture of tin plate after the passage of the McKinley tariff.

It is reported that the Virginia Iron & Railway Co., Goshen Bridge, Va., will blow in its furnace early in the new year.

THE TIN PLATE MARKET.

The tin plate market for the past week has remained in the same stagnant and uninteresting condition that has existed since the close of the canning season, and the trade on spot plates has been very small and unsatisfactory. Some few orders for nearby deliveries have been on the market and were placed without difficulty at prices showing some concessions from the regular quotation of the mills. It is often customary for many of the large can makers to place heavy contracts for tin plate deliveries January to October during the month of December. This year comparatively little business has been closed, and while some large inquiries are upon the market, as yet they have resulted in no orders, though concessions by the mills have been made in several instances. The trade to-day is at sea as far as prices are concerned.

All kinds of rumors and reports are afloat concerning the prices that have been made by various mills, it being claimed that coke tins have been sold as low as $2.72½ maker's mill, both Gas Belt and Pittsburg districts deliveries through to October. The mills are asking all the way up to $2.90 for same article, same deliveries. No actual business is reported at the lowest price named, but undoubtedly the market has weakened during the past week, because of anxiety on the part of the larger mills to cover a certain proportion of their output for next season.

The average quotation of the market f.o.b. Pittsburg or Indiana districts is as follows:

CHARCOAL TINS.

	IC	IX
Lisvane Grade,	$3.45	$4.20
Calland Grade,	3.65	4.35

COKE TINS.

IC, 108 lb. Basis weight,	$2.95
100 lb. " "	2.85
95 lb. " "	2.80
90 lb. " "	2.75
85 lb. " "	2.70
80 lb. " "	2.65

TERNE PLATES.

IC, 216 lb., 20 x 28	$5.95
200 lb. "	5.65

The New Foundrymen's Association.

The committee appointed at the meeting of foundrymen held in New York Dec. 1, to prepare a constitution and by-laws for the proposed foundrymen's association having as its object the equitable adjustment of labor questions, met in New York Dec. 15 at the club house of the American Society of Mechanical Engineers. The members reported an encouraging outlook, and were gratified to know of the endorsement their efforts are receiving from foundrymen in all parts of the country. A constitution and by-laws were drafted which it is believed will meet the approval of those who are expected to be interested in this new association. An address was drawn up that will be sent to a number of the leading employers of foundry labor in the country, calling a meeting for final organization Jan. 26. This date was selected because the National Association of Manufacturers meets in New York Jan. 25, 26 and 27, and leading foundrymen are expected to be well represented. The foundrymen's meeting will be held at the house of the American Society of Mechanical Engineers, No. 12 W. 31st st., and headquarters will be at the Imperial Hotel.

CITY FOUNDRY No. 1 and City Foundry No. 2, of Cleveland, will be operated under separate managements hereafter, a division of interests having taken place. Messrs. Lonergan and Knorr have bought the interest of the Messrs. Patterson in City Foundry No. 1 and will continue the business under the name of City Foundry Co. Chas. Patterson, Frank J. Patterson and Henry Maley take City Foundry No. 2 and will operate it under the name of the Patterson Foundry Co.

The 8-foot bell of the Hannah Furnace, Mahoning Valley Iron Co., Youngstown, O., is being replaced by one of 9½ feet diameter.

THE Illinois Car & Equipment Co., J. Maris, of Chicago, general manager, contemplates certain improvements to the Anniston, Ala., plant, but no definite decision has been reached.

PERSONAL.

The celebration one day last week of the 88th birthday of Lord Armstrong, the veteran head of the great works at Elswick, reminds us that, although he is probably entitled to be spoken of as the patriarch or "Doyen" of the iron industry, he has not a few competitors, more or less known to fame, for that distinction, and notably Sir Lowthian Bell, Sir Henry Bessemer, and Sir Bernhard Samuelson. The veteran inventor of the Bessemer process is now about 86 years of age, but he is by no means so hale as he was.—[London Iron and Coal Trades Review.

W. J. Corrington has been made manager of the St. Louis Branch of the Davis & Egan Machine Tool Co. He was formerly connected with the main office at Cincinnati.

D. G. Kerr, superintendent of the blast furnaces at the Edgar Thomson Steel Works of the Carnegie Steel Co., Ltd., was presented last week with a horse and carriage by the assistant superintendents and foremen of the furnaces.

E. Lauck has been made superintendent of the United States Iron & Tin Plate Works at Demmler, Pa.

George M. Chandler, late of the Chandler & Taylor Co., of Indianapolis, Ind., has connected himself with the Brownell & Co. as salesman.

F. F. Prentiss, of the Cleveland Twist Drill Co., Cleveland, has sailed for Australia.

James Purves, formerly with the Buhl Steel Co., Sharon, Pa., is superintendent of the new open-hearth department which Manager Potter has been adding to the Cleveland Steel Co.'s plant.

Carl Ericson, of the Gellivare Mining Co., of Stockholm, Sweden, has been visiting Pittsburg steel plants for the past week, and later will visit the Lake Superior iron mines.

R. L. Curthhut, Alexander McArthur, H. C. Nolen, L. S. Hubbard and L. D. Platt are expert accountants, now in Cleveland to examine the books of the Cleveland Rolling Mill Co., the HP Nail Co. and the American Wire Co. on behalf of the promoters of the wire and wire rod combine. They are now at work in the offices of the Cleveland Rolling Mill Co.

Mammoth Plate Mill to be Built at Homestead.

The Carnegie Steel Co., Ltd., contemplates another large addition to its Homestead plant and has secured ground for the improvement. The new building will be for a universal plate mill, which will exceed in capacity any mill of this class ever designed. Work has been begun on the plans and will be pushed rapidly to completion. The mill will occupy the ground recently acquired by the company in Homestead and will employ a large force of workmen. The Carnegie company, with this addition, will have the largest capacity for the production of universal plates in the world.

THE notices sent out by Naval Secretary Long, to various cities, that bids will be received for site, buildings and equipment for the proposed Government armor plate plant mention the following as the general requirements: 140 to 160 acres of good land, with a good foundation, good drainage and a good water supply, and facilities for railroad connections, having erected thereon 10 one-story steel buildings, with sloping roofs and brick fillings, between the columns; four Wellman tilting basic open-hearth furnaces, with generators, gas producers and hydraulic appliances complete; two small smelting cupolas; two core ovens; one small and 12 large heating furnaces with regenerators; three heating furnaces for tempering; 16 regenerative car-bottom cementing furnaces; one special furnace; face hardening spray apparatus.

THE Carnegie Steel Co., Ltd., has contracted recently with James Bonar & Co., Pittsburg, for 22,500 h. p. Pittsburg feed water heaters and purifiers. The purchaser will place 6,000 h. p. at the Lucy Furnaces, and 16,500 h. p. will be put in at the Homestead Steel Works, as follows: 8,000 h. p. in the new 38-inch blooming mill, one 4,000 h. p. each in the 35 and 40-inch mills and 500 h. p. in the open-hearth department.

S. E. MAXWELL, of New Castle, Pa., is organizing a company for the manufacture of his gas engine, and the probability is that the plant will be located in or near Pittsburg.

THE WESTERN FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Western Foundrymen's Association was held Wednesday evening, December 15, 1897, at the Great Northern Hotel, Chicago. In the absence of the President, William Ferguson, vice-president, occupied the chair.

The following were present: Wm. Ferguson, H. C. Loudenbeck, Gates Iron Works; Fred A Young, Jos. Dixon Crucible Co.; A. Sorge, Jr.; H S. Vrooman; D. L. Cobb, Sloss Iron & Steel Co.; D. H. Truesdale, Cribben, Sexton & Co.; W. L. Thompson, Link Belt Machinery Co.; O. T. Stantial, L. W. Lukens, Illinois Malleable Iron Co.; H. F. Frohman, J. E. Evans, S. Obermayer Co.; P. D. Sloan, Garden City Sand Co.; S. T. Johnston, W. Stein, Whiting Foundry Equipment Co.; A. W. Bodell; E. E. R. Tratman, *Engineering News*, of Chicago F. M. Lyon, Burlington Route Foundry, Aurora, Ill.; W. N. Moore, Joliet Stove Works, Joliet, Ill.

The following amendment to the by-laws was adopted: In Article V., Section 1, substitute the word "plurality" for the word "majority."

The paper of the evening, "A Method for Obtaining Weekly Shop Costs," was read by Mr. W. N. Moore, its author. It will be found on another page.

Discussion.

Mr. Ferguson: I would like to inquire how long it took from the commencement of this system before you obtained satisfactory results.

Mr. Moore: It has been in use for six or eight years; and it was begun so long ago that I can hardly answer the question. It proved satisfactory from its inception.

Mr. Ferguson: We are just now beginning with a system but I am afraid it is going to take too long before we can get at satisfactory results.

Mr. Thompson: While Mr. Moore says the figures given in the paper are entirely fictitious, I would like to ask him if 94.4 per cwt. is anything like the general average of casting produced from one hundred pounds of melted iron.

Mr. Moore: I would answer that question by stating that the figures are entirely fictitious. They are not intended to convey anything as to actual results. At the same time if it had been 104.4 it would have made the table more nearly correct. That item is always in excess of one hundred pounds. It takes more than one hundred pounds to make one hundred pounds of casting. Our records show that it takes about 104 pounds of iron to make 100 pounds of casting.

Mr. Johnston: I would like to ask Mr. Moore if he has the men extend the amount opposite their time.

Mr. Moore: The men count their hours, the rest is done in the office.

Mr. Stantial: It is impossible for us to adopt any such system as this on account of the variety of work. It is all very well in a stove or machinery foundry, but where you are turning out all kinds of work you have to keep special costs. I do not see unless it is getting the general run of casting, how we can possibly apply a scheme like this to our work.

Mr. Ferguson: It has been my experience in the general foundry business, that we have been getting cost per ton, and once in my experience we tried to get a detail cost on every individual piece produced in the job, and after employing this about 30 days,—we were running at that time in the neighborhood of one hundred and thirty molders, and hired a half-dozen clerks to look after the system,—we did not consider it a success. I know now of another concern which gets individual costs and handles it in pretty good shape. From my own experience in the general foundry work I never saw the necessity for detail costs. I have always contended that it would cost more money to keep the system running than the gain therefrom. I fail to see any benefit to be gained from detail costs in the general foundry work. In our system we divide the work into four classes. In the first class we put greensand; dry sand and loam work in the second class; hard iron in the third class, and shop-tools in the fourth class. The coremakers' time is taken care of in each class. A compilation of that is taken for 30 days and a report made on that basis always seems to me to be all that can be got out of it. Of course an individual cost system might be beneficial for estimating closer than this other system.

Mr. Sorge: I cannot agree with Mr. Ferguson as far as the keeping of individual costs is concerned. It is not merely for the purpose of estimating. A keeping of individual costs does not give a record as to the expense and if it is done in a proper and systematic manner it can be done with slight expense. I know where the keeping of costs for 120 molders involved the labor of one clerk, and I could have the individual cost of any piece produced in that shop. As to trying a system of that kind for 30 days, I think our chairman will agree with me that that is not a fair trial. Similarly with chemical analyses. He saw once connected with an establishment where they tried chemical analyses for a short time and the analyses did not prove a success. Now if you were attempting to make an experiment of 30 days with chemical analyses your results would prove that it did not pay. A similar thing applies to the cost system. The longer it is kept up the more valuable it becomes. Methods can be judged much more accurately than by the judgment of an individual. I want to ask Mr. Moore a question. He states that he gives a shop number to a certain stove. Does that involve every piece of that stove or simply the stove itself?

Mr. Moore: We do not have special shop numbers for the separate parts. There is a multitude of castings and it would hardly warrant the effort to number each one separately. I will say that this description of our method is not presented as one which is of general application. It was presented merely with the thought that it might possibly be of interest. The conditions in a stove foundry or in any shop making a specialty are of course radically different from those in a general foundry. It is not to be thought for a moment that a plan that will be satisfactory under one set of conditions is applicable to another set. In the three labor items, the Groups II., III. and IV., especially Group III., a general labor item which includes the yard work, cupola and grinding,—we have found a great variation. When we are running a large heat we need a large number of men, but when the heat is reduced two-thirds, then we have to drop off some of the men, and the practical value of knowing that is worth a good deal. The natural tendency in our shop is that when we are running a lot of men and the heats drop down to 40 or 50 per cent we drop a man here and there, but we keep three-fourths or two-thirds of the men to do one-half or one-third of the work, and a report of this kind brings that very forcibly to the knowledge of the office. There are some facts in connection with this method which might be of interest. If special work comes in from outside we attach a shop number to it. The cost of the casting we assume to be practically the same, but the other costs vary greatly. There are special shop order numbers for those items and we enter them in the ledger accounts and have them to ascertain the unusual costs on a set of castings. We can turn to the ledger at any time and find the actual expenditure on any class of work done.

Mr. Ferguson: I would like to say a few words on the points that Mr. Sorge mentioned. He said that the keeping of the individual costs was not for the purpose of helping to make estimates on work. I have also had it stated to me when I have asked the question how the keeping of shop costs was going to reduce the cost of production, that it was not for that purpose. If it is not for an economical purpose wherein is there any benefit to be gained from the system? I cannot see anything except a knowledge of the whole working of the concern being placed in the hands of the head of the concern instead of in the hands of the foreman or superintendent and left to his management.

Mr. Sorge: I may have stated what the chairman ascribes to me, but I am under the impression that he did not understand me. It is not merely for the purpose of estimating, but certainly it is concerned in the estimating and does help in the reduction of costs, and is of as great importance in the very thing that our chairman brought out, as anything—that of informing the head of the concern regarding the workings of the shop.

On motion, duly seconded, a vote of thanks was tendered Mr. Moore for his very able paper.

Discussion on Molding Sand.

The discussion of the paper on "Molding Sand," by D. H. Truesdale, was then taken up, this discussion having been

begun at the meeting in Cincinnati, where the paper was read.

Mr. Ferguson: I believe it is due to the members present that I make some explanation regarding Mr. Loudenbeck's table [shown below], and in doing that I will state that as long as I have been in the foundry business I did not know anything about molding sand. I never was familiar with the constituents, and when it was given out that this paper was to be further discussed this evening I made up my mind that I would find out what was in our molding sand. I had our chemist make analyses, and this table is the result of that work:

ANALYSES OF MOLDING SANDS DRIED AT 100° C.

	No. 1. Fine sand for snap work.	No. 2. Medium grade for medium class of work.	No. 3. Coarse sand for heavy machine castings.	No. 4 For heavy machinery in dry sand molds.
Silica	81.50	84.86	82.92	79.81
Alumina	9.88	7.03	8.21	10.00
Ferric Oxide	3.14	2.18	2.90	4.44
Combined Water	3.00	2.20	2.85	2.89
Calcium Carbonate	1.85	1.10	1.10	1.25
Magnesia	.65	.98	None.	.88
Potassium	Not estim	Not estim.	Not estim.	Not estim.
Manganese	Trace.	Trace.	Trace.	Trace.
Organic Matter	Trace.	Trace.	Trace.	Trace.
Total	100.02	98.35	97.98	99.27

Mr. Loudenbeck: Four samples of molding sand were taken for analysis which are designated as Nos. 1, 2, 3 and 4. These samples were dried at 100 degrees C. and the dried samples taken for the determination. This gives a sand perfectly dry and easily crumbled. There is still water in the combined form, which cannot be driven out without additional heat approaching a red heat. This is designated as combined water and is combined with the alumina in the form of clay, the alumina being the highest in No. 4. There is one fact that might be explained in this connection, that alumina is not clay. Clay contains alumina and its its purest form contains about 40 per cent. Clay is a hydrated silicate of alumina; that is, it is a compound containing silica, alumina and water. Alumina in itself is infusible and in nature occurs as corundum, ruby and sapphire. It forms a slag when combined with silica. Silica in itself is infusible. It occurs in nature as quartz, onyx and sand. All geological formations, except chalk, contain silica or silicates. In molding sand part of the silica exists as quartz sand and part in combination as clay. Although silica in itself is infusible, when in combination with suitable bases it forms a slag. The bases that are suitable are alumina, magnesia, calcium, iron manganese and the fixed alkalies. These combinations are called silicates and have various fusing points, for example:

Silicate of	Alumina	melts at	2400	Deg.	C.
" "	Magnesia	" "	2200	"	"
" "	Lime	" "	2100	"	"
" "	Iron	" "	1800	"	"
" "	Manganese	" "	1800	"	"

A more fusible slag is a mixture of the silicate of alumina and lime; and if potassium is present the melting point is lowered still more. If lime and potassium are present in molding sand they will readily combine with silica and form a fusible slag at the contact of the melted iron with the mold. As the melting point of silicate of alumina is 2,400 degrees C., I hardly see how a slag could be formed at the temperature of cupola melted iron, and I believe if pure quartz sand and clay are the constituents of molding sand, free from all other impurities, no slag will be formed. It is only when the impurities, such as lime, magnesia and potassium are present that the conditions are favorable for forming a fusible substance, and it is only when these compounds are in excess that any great trouble would occur.

Considering the iron, I may say I have estimated this as ferric oxide, but some may be in the form of ferric hydrate and some, possibly, as ferrous hydrate. I have not had time to investigate this as I would like. When these sands were heated to a red heat they became darker in color, changing from a light yellow to a dark red, indicating some change in the condition of the iron. Iron exists as ferrous oxide in many clays, and if it should be in that condition in molding sand, it might form a slag as silicate of iron, which fuses at a lower temperature than silicate of lime.

I have devoted most of this discussion to the fusible constituents of molding sand and have not considered the very important properties, as strength and porosity, and before closing would like to make one statement in regard to the effect of clay on these properties. The confined gases and water vapor must escape, if not readily through the sand, then at a point on or near the surface of the casting. The pressure of these gases on the iron while still fluid or in a pasty condition would tend to make a rough casting. A high per cent of clay makes the sand too dense and too strong.

Mr. Sorge: Mr. Loudenbeck does not say whether the calcium carbonate is the normal carbonate or the bi-carbonate.

Mr. Loudenbeck: The calcium carbonate as it exists in nature is usually in the form of the normal carbonate.

Mr. Sorge: My experience has usually been that it has been the bi-carbonate. You will find that if you take the sand after it is washed, the washing contains, frequently, considerable bi-carbonate. The bi-carbonate is very unstable and will give off one portion of carbonic acid, when heated, and is therefore a dangerous constituent in molding sand.

Mr. Loudenbeck: The bi-carbonate as it is found in nature would be washed out and dissolved by the water.

Mr. Sorge: You mean it would not appear in the sand, but the water gets it from the sand; it therefore has been in the sand and is constantly being dissolved by water percolating through the sand, and consequently is present in the sand. The reason why I ask is because I do not think the mono-carbonate would be as serious a matter in sand as bi-carbonate The bi-carbonate by giving off one portion of carbonic acid is a serious matter. I have found little pittings in which are inclosed little pieces of white material and at the same time little holes in the iron. It seemed to me to indicate that the bi-carbonate had given off one portion of carbonic acid.

Mr. Loudenbeck: It seems to me that if the calcium existed as a carbonate the heat of the melted iron would be sufficient to change the calcium carbide to oxide at the portion where the iron strikes the mold.

Mr. Stantial: A number of years ago after a discussion of this kind I had occasion to make an analysis of sand that was giving the best of results and considered A No. 1 sand. I had always understood that the presence of lime in molding sand, over, say, two or three per cent, was injurious, or in other words was fatal to the sand as a molding sand. In this analysis, speaking from memory, there was in the neighborhood of 11 or 12 per cent of lime in that sand. I cannot say whether it was in the form of carbonate or not. It was a first-class molding sand.

Mr. Loudenbeck: The lime in the sand may be there as a sulphate If it is in that form I see no particular harm in it.

Mr. Ferguson: I can tell a little of my own experience. I was out in Nebraska in a place where there was no molding sand to be had, and I had to use something as I did not have the money to import it. I took what is known as alkali clay. You will see it where it is covered with a white substance. I do not know what that whiteness was composed of, whether it was lime or what it was. We used that clay—a sandy clay—for molding purposes, and I never saw better castings made in any kind of material. The castings made in this way came out clean and nice.

Mr. Sloan: I was going to ask what per cent of lime there was in the sand used by Mr. Truesdale. I always supposed that sand containing five per cent of lime would be injurious for molding purposes. I have with me a sample of casting made from sand containing a near as I am able to learn from three to five per cent of lime and I submit it as a proof that lime does not spoil the sand.

Mr. Sorge: The fact of the matter is that the statement that there is lime in this or lime in that does not explain anything. We must know the exact form of combination of that lime before we can judge of its effect on the sand.

Mr. Ferguson: We have a sample of a plate here which was presented to Mr. Sorge by Mr. Truesdale made in sand without facing of any kind.

Mr. Truesdale: I will state that the pattern for this plate was a little white metal card receiver and the sand would not leave the plain surface, therefore the plain surface is a little rough. On the ornamental part the sand left it very clean. The fine lines was what I was trying to produce. It was made with a mixture of very fine sand coming from Zanesville,

Ohio, and 60 per cent of pure silica. Both sands were dried and measured.

M. Ferguson: I would gather from your statement and judging from the analysis that most of our sand is carrying too much silica.

Mr. Truesdale: I do not think that is good reasoning. That plate would have been better if the sand had been higher in silica. I was afraid to give the man who did the molding an extreme mixture. I was afraid he would play some trick, so I made it 60 per cent and stood over him. I would have had far better results if I had had a larger proportion of silica. I wanted to show what could be done in the way of producing fine lines by the use of silica sand. I have had sand brought to me by sand men. They will come in with samples Nos. 1, 2, 3, 4, etc., and will say that they have sand containing about 80 per cent silica, and sometimes they say 90 per cent silica. One man said that the sand contained 90 per cent of silica and he gave me a sample, and I washed it and it only had about 15 per cent silica. I have no chemical knowledge but I am giving my own experience. I have used upwards of 1,000 tons of silica sand. The shop I left in Cincinnati used it largely. They used sand containing from 40 to 50 per cent of silica and sometimes it contained 75 per cent, and the results were always satisfactory. I have attributed the success of William Resor & Co.'s castings largely, besides the education of the men, to the use of silica sand. I am adopting it here and am having better and better results every day. I have not got to the end of it yet. It is a long hard fight with stupid molders. They condemn a new thing. I am making progess. I am making better castings than they did before. I did not begin with all the men at first. I picked out about a half dozen who seemed to have more sense than the average run. They condemned it at first, now they all want it. The men who opposed it the most are to-day using it gladly.

Mr. Moore: I would like to ask Mr. Truesdale whether in stating that particular casting was made with sand containing 60 per cent silica, he did not mean that he added 60 per cent pure silica to the sand, so that the actual percentage of silica in the sand must have been 75 or 80 per cent?

Mr. Truesdale: Yes. Mr. Vrooman can tell us how much silica there was in the sand originally. He sold it to us.

Mr. Vrooman: I should say that sand ran about 60 or 70 per cent silica.

Mr. Truesdale: Some years ago we took a contract in Cincinnati for making cornice work and the job came from a machinery foundry where they used coarse sand. The question came up whether we could do it with find sand. They said we could not do it. I did not believe it and said I was going to try it. I went ahead and the result was that we made those castings, weighing 800 pounds, domes for furnaces, in the fine sand. Now, I know these things from practical experience, but I have no scientific knowledge on the subject.

Mr. Vrooman: I looked at that analysis when I came in and I told Mr. Sorge that I did not believe the alumina item was correct. Mr. Loudenbeck says he does not class clay as alumina. I do not believe there is any sand that contains enough lime, oxides or other foreign matter to do any damage. There is sand dug in all parts of this country, under all conditions, and there are all classes of work done by all classes of men and I do not believe I ever saw in any shop the sand run together in a slag under melted iron when poured in a mold.

Mr. Ferguson: If you will come up to our shop I will show you some.

Mr. Vrooman: I do not believe it is due to the sand unless the sand contains some vegetable matter. Perhaps you used a casting too heavy for the sand.

Mr. Ferguson: It can be prevented with the addition of sea coal to the same sand.

Mr. Vrooman: I think the whole matter in sand lies in its crystal formation. One crystal may be a conductor of heat and another crystal may be a non-conductor of heat. Silica appears in two forms in the sand, free and in combination. The free silica gives porosity to the sand and the silica in combination adds to the life of the sand in connection with the crystal formation. If the crystal is such that it is a non-conductor of heat it does not permit the heat to penetrate as deep as the sand does whose crystal is a conductor of heat. You coat your sand with a plumbago or some other facing that is fireproof and that does not permit the sand to fuse. Coming back to the question of crystal formation, you have noticed when taking a casting from the mold that you can see a white line showing how far the red heat has penetrated and how much of the sand has been dried. I make the claim that all sand once brought to a red heat has lost its life and will no longer combine with water. If you have a sand that is not a conductor of heat that heat will penetrate further from the face of the mold and the sand will burn out sooner. It is not the alumina in your sand that makes it wear longer. It is not because it does not have any calcium carbonate or manganese. It is on account of its crystal formation. I do not believe that you will find iron or lime or any of those foreign elements except vegetable matter that will do any damage.

Mr. Truesdale: Did I understand you to say that sand once heated to a red heat is destroyed? I beg to differ with you. I took some sand and put it in one of our big boilers and kept it there for ten hours under a heat of 1,500 degrees, and removed it, and the next morning I took it and molded in it.

Mr. Vrooman: I will take the same argument as with fire brick. Fire clay is about as plastic as anything you can get hold of. If you mold it and put it into the form of a brick and bake it in an oven and take it out and allow it to cool and regrind it, it never will combine with water again. It may be possible that your heat was not sufficient.

Mr. Sloan: Mr. Vrooman has made a statement that fire clay is about as plastic as anything you can find. All fire clay is not plastic. Fire clay comes from some parts of Ohio and Pennsylvania and is as hard as a rock. Plastic clay makes the poorest brick upon the market. I would like to ask Mr. Truesdale how much facing he used on that plate.

Mr. Truesdale: There was not a grain of facing of any kind used upon it. I used a No. 24 riddle.

Mr. Evans: I would like to ask whether there would be any economy in using a No. 10 riddle rather than a facing.

Mr. Frohman: There has always existed the impression that facings were black. But a facing is manufactured that is called a silica facing and is made from pure silica and ground very finely and bolted. It is practically the same as the sand that Mr. Truesdale is using. It is a question whether it would be cheaper to buy this facing or to use silica sand and use a very fine riddle.

Mr. Evans: If this silica sand is such a fine thing I should think all the foundries in the country would adopt it. It seems to lie with two foundries, one in Ohio an done in Illinois.

Mr. Truesdale:. I have had something to do with trying to introduce new ideas to molders. The average molder is not very good at taking up with new ideas. A foundryman will come into you place and see you doing a new thing. He will say that is pretty good, but he will not adopt it.

Mr. Moore: I want to say a word or two regarding the reason why, if it is a good thing, it has not been adopted by a whole lot of foundries. The fact is that there has been a class of work done in the William Resor Co.'s foundry which is superior to that done by any other foundry, certainly this side of the Hudson River, and possibly it might be in this country. The reason why the rest of us have not done the same thing is that we have not taken the intense interest they have. Mr. Truesdale has brought up here a little arrangement for daubing ladles. If you will note the ingenuity that is displayed in that arrangement and then consider the care he uses for every detail of foundry work, you will understand that it takes more than silica sand to produce such fine results.

The meeting then adjourned.

At New Castle, Pa., Receivers E. N. Ohl and W. E. Reis of the Atlantic Iron & Steel Co. were discharged by the court, Dec. 17, and the reorganized company is in charge. Preparations are making to start the plant.

The Reading Crane & Hoist Works, Reading, Pa., acquired recently exclusive rights to three patents relating to improvements on chain hoists, which have been granted to J. W. Kincaid, of Reading. The company intends to make the hoist business a special study, and will make different kinds of hoists according to the needs of consumers.

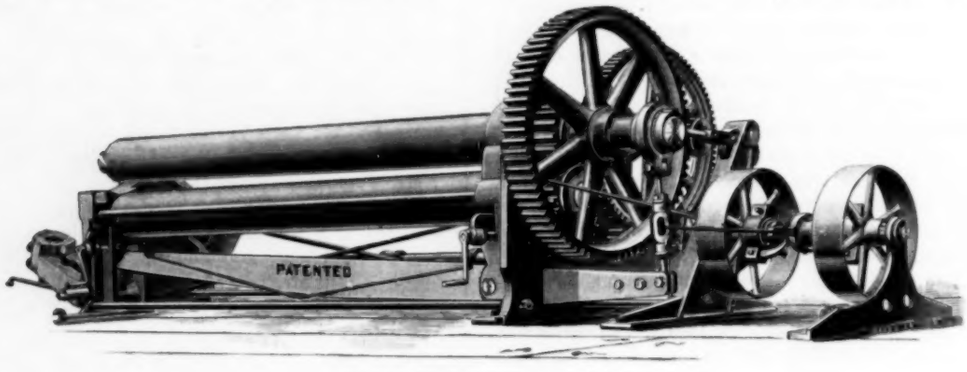
IMPROVED PLATE-BENDING ROLL.

A 10-ft. machine for bending boiler plates has been brought out by Bertsch & Co , Cambridge City, Ind. The illustration indicates well its construction and operation. It provides a new method of opening the roll to remove formed plates, being practically an automatic opening, closing and adjusting roll. The opening and closing are effected by disengaging and turning back the hinged housing supporting the top roll. This raises and supports the end of the top roll and at the same time lowers the opposite end of the bottom roll sufficiently to release a formed plate of extreme width. This is accomplished by the steel lever beneath, being operated by a lug on the lower end of the hinged housing and connected to the opposite end of both the top and bottom rolls. By this arrangement the top roll need be raised but little to release a formed plate, and the bottom roll aids in raising and supporting the top roll. The hinged housing, lever and top roll being so constructed as to be in balance, the machine is opened and closed readily and the adjustment of the lower feed roll need not be changed after the machine has been opened and closed.

These rolls being of the initial style (with large and strong gearing), and having the two front rolls geared, giving a positive feed, and the top roll being smaller than that of the old pyramid style, much smaller circles can be formed in one operation than with that style of roll. Plates can also be bent nearer the end.

The power adjustment is on the back roll which is the principal adjusting and bending roll. This adjustment is important to general purpose rolls which should have a wide and rapid range of adjustment for forming large and small shells alternately, on occasion, without loss of time. With the power adjustment the back roll can be adjusted in one-sixth the time required by hand. The back roll being adjusted by a worm gear running in oil, is powerful and well adapted to forming rounded corners in light, and heavy plates if not of extreme width. To do this the back roll is raised when the plate is in the machine and the metal bent around the top roll as far as practicable. The shell of a fire-box for stationary and portable boilers can be formed complete on this roll, with power adjustment, in four to five minutes, making it convenient thus to bend irregular shaped work. Small cylinders can be formed complete and removed from the roll at the rate of two per minute. Either end of the back roll can also be adjusted, by power or hand, independently of the other for cone shaped work.

A special feature to be noted is that when so ordered, these rolls are furnished with patented multi-band friction clutch pulleys for reverse motion.



IMPROVED PLATE-BENDING ROLL.

Reference was made in these columns a few weeks ago to the acquisition of all the ovens of the Southwest Connellsville Coke Co., near Mt. Pleasant, Pa., by the Illinois Steel Co., which has held for some years an 85 per cent interest in the coke company. H. C. Frick, who held the remaining 15 per cent, takes for his interest the unimproved property of the company—1,250 acres of coal and 220 acres of surface, the value being estimated at about $1,000,000.

The Alabama Foundry & Machine Works say that the report is incorrect, that they are enlarging their plant. There is no intention to do so.

THE TROPENAS PROCESS OF STEEL-MAKING.

A description of the Tropenas process of steel-making was given in these columns some months ago, and references have been made in iron and steel journals at various times to the claims made for it. Commenting on some of the criticisms that have appeared in the United States, Edward Allen & Co., Ltd., of the Imperial Steel Works, Sheffield, Eng., write.

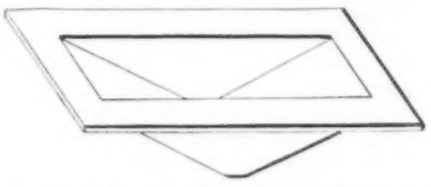
"If we get from a process results which are highly successful, both mechanically and commercially, what would you think if we gave it up and quarrelled with the inventor because his theories about it did not commend themselves either to us or to somebody else? Apparently, steel manufacturers in theStates dare not take up the Tropenas process because somebody (who has not had experience of it) says the theory is wrong; or, rather, because somebody says the theories of the inventor of quite a different process are wrong. We have heard, in fact, that 'expert opinion' in the States has asserted that Tropenas steel cannot be good 'because it is made in a Bessemer converter.' If such an opinion has really been expressed we can only express our astonishment at the total misapprehension of the nature of the Tropenas process and its results. Anyhow, the opinion is not very complimentary to the Bessemer process."

The *Engineering News*, in which the above appears, says editorially: "We freely admit that the use of the Tropenas process by such a firm as that named above, and by the numerous firms which have adopted it in Belgium, France, Russia and other countries, together with the excellent material which we are authentically informed is produced by the process, is all good evidence that it must have merit. Yet the chief distinguishing feature of the process, so far as we can learn, is the use of two sets of tuyeres, one of which is about four inches above the other set, and is used only for a short time at a certain stage of the process. It still seems to us quite inexplicable that so slight a detail as this can influence the character of the product so largely as is claimed by those interested in the Tropenas process. The only reason we find given in favor of the two sets of tuyeres is that the upper set gives an additional supply of air, and burns the carbonic monoxide to dioxide, thereby giving a high degree of heat in the converter. It is urged that this high heat gives a metal so hot in the ladle that very small castings can be poured. Also that from some cause or other the metal is very quiet in the ladle, and sound castings are made without the use of large sinkheads. This explanation runs counter to some generally accepted ideas regarding steel manufacture. However, the results obtained by manufacturers using the process seem to be so excellent and so well attested that it seems well worth investigation by American steel founders and metallurgists."

In speaking of the report of the experts appointed to consider the feasibility of establishing a Government armor plant and its cost, Joseph Wharton, of the Bethlehem Iron Co., said: "One feature of the Government project is that the proposed Government plant is meant to be capable of producing 6,000 tons of plate annually, which is about double the present capacity of the finishing tools in either of the existing plants. But either the Bethlehem or the Carnegie establishment can easily be brought to a capacity of 6,000 tons by merely adding, at light expense, certain tools to the otherwise complete plant."

A BRAZING CRUCIBLE.

Liquid brazing is coming forward as a substitute for the flame method. Several years ago it was demonstrated that a specially treated joint, plunged into molten spelter, would not only braze in a very few seconds of time, but would come out almost entirely free from scale, a brisk cleansing by a metal brush practically all the after treatment required. The

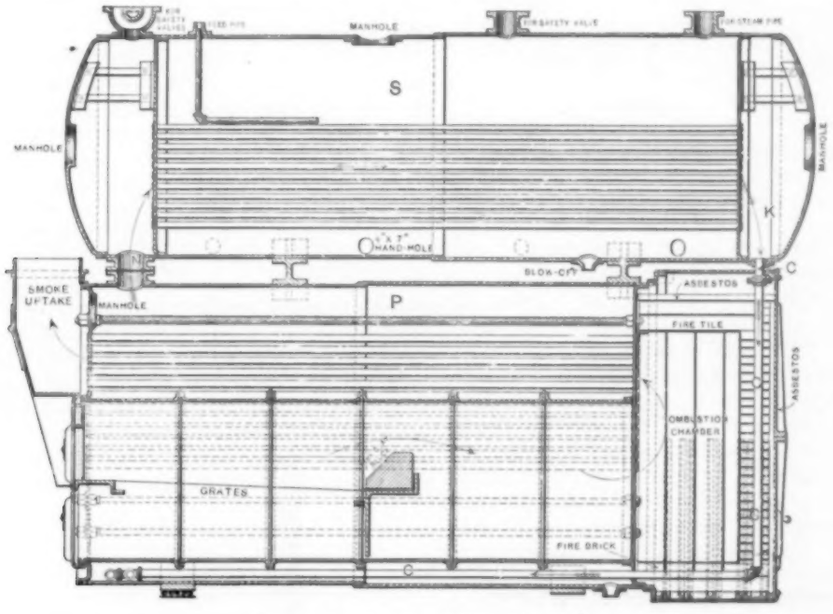


process was secret, the most important point being the anti-flux, which was a preparation painted over the parts to which it was desired the spelter should not adhere. Some difficulty and delay in the securing of the patents prevented the process being put upon the market in a commercial form, but a number of experiments have demonstrated its value and it bids fair to become in general favor. Liquid brazing consists in reducing the spelter to a molten form in a suitably shaped crucible at a high temperature, and then immersing the joint to be brazed in the liquid mass. The surfaces to be brazed are painted with a flux, and the adjacent parts with an anti-flux. A few months ago nothing definite was known regarding the best preparation for an anti-flux, each experimenter endeavoring to find out the best for himself, but the Joseph Dixon Crucible Co., Jersey City, N. J., placed on the market an anti-flux known as brazing graphite, and repeated tests have demonstrated its value, so that it is predicted another season may witness a complete revolution in brazing methods. On account of the high degree of heat required even the best of wrought iron vessels possessed but short life. The Dixon company was called upon to furnish some vessel that would successfully withstand the intense furnace heat. It has furnished several styles of graphite bowls, oblong crucibles, and other special styles, but now manufactures a crucible specially adapted for bicycle manufacturers. An outline sketch is shown above. It is 24 x 6 inches inside, the bottom forming an angle, being 10 inches deep in the middle. It has a three-inch flange to support it in the furnace, and can be used in either coke, coal, gas or oil furnace. The shape makes it particularly suitable for brazing the crank-hanger joints.

THE Pittsburg, Bessemer & Lake Erie Road has given orders for 13 locomotives, dividing them among the Pittsburg, Brooks & Baldwin works. They will be delivered in February. It is the expectation that 1,300,000 tons of ore will be handled at Conneaut next year.

THE PECK RE-EVAPORATING BOILER.

The style of boiler shown in the accompanying sectional view is designed for use more especially where feed water is not well suited for evaporation in steam boilers. It is made both as an internally fired boiler, like that shown, and as an externally fired brick-set boiler. Steam is generated in the primary boiler P; it then enters the secondary boiler through the neck N, and, passing through the steam tubes, gives up its heat and evaporates the water in this secondary boiler. It is condensed during its passage through the steam tubes and passes into the condensation chamber K. Thence it flows by gravity through the circulating pipe C back into the primary boiler, there to be re-evaporated and perform its office over again. The steam formed in the secondary boiler S is that which is used for power or heating, and the feed water is introduced into this boiler in the usual way. As the lower or primary boiler is fed by its own condensed steam, the surfaces always remain clean. The sediment and scale-forming ingredients deposited in the secondary boiler do not bake upon the surfaces as in an ordinary boiler, as these surfaces are not fire-heated. The arrangement of boiler and manholes and handholes is such that all parts are accessible for cleaning or washing out. Its adaptability for use with impure water i evident.



THE PECK RE-EVAPORATING BOILER.

The danger from low water is reduced to a minimum. The primary boiler, being fed by its own condensed steam, receives as much water as it evaporates, and the water line may be carried close to the tubes. The lowering of the water line below the upper tubes in the secondary boiler results only in the loss of use of the surface, as the tubes are steam tubes instead of fire tubes. The arrangement of the circulating pipes overcomes the lack of circulation usually met with in the portion of internally fired boilers located under the furnaces.

The efficiency of the boiler is well maintained, since the heating surfaces are always clean and the water level uniform in the primary boiler. The patentee and manufacturer is Cassius C. Peck, 39 State st., Rochester, N. Y.

AN officer of the Pennsylvania Railroad is quoted as saying: "We have hauled more freight lately than ever before in the history of the road. There has been a scarcity of cars in Western Pennsylvania. The shops at Altoona have been working overtime, and it seems certain that all departments will run full time throughout the winter. An order for 500 more freight cars was given the other day and progress is being made on a lot of heavy freight locomotives intended for hauling coal to the lakes."

THE Du Bois (Pa.) Iron Works Co. will add shortly three large compressed air cranes and other new machinery.

METHOD FOR KEEPING WEEKLY SHOP COSTS.*

BY W. N. MOORE.

The necessities of shop management with reference to current cost records are: that they be practically accurate, continuously formed as a running record, always up to date within the shortest possible interval, and that the method be direct and inexpensive. The plan here given for recording labor and material costs has been in use for some years in a stove foundry, and has met these requirements. The various operations of the shop are classified, grouped, and, so far as desired, designated by separate numbers which are known as "shop numbers," and are also used to designate corresponding ledger accounts.

As a matter of convenience, certain numbers are reserved for what are known as standing shop orders, which relate to constant operations; such as Cupola Attendance, Unloading Material, Care of Boiler and Engine, Repairs to Building, Repairs to Flasks and Machinery, Warehouse Labor, etc. Other numbers are reserved for Molding, Mounting, Nickeling, etc. Numbers between 1 and 10 indicate General Labor items. Those between 20 and 30, Machinery and Power; 300 to 400 indicate Mounting Shop Operations; 400 and above are used for special jobs, done either on shop account or custom work. These reservations add a significance to the numbers themselves and facilitate their proper use.

The day worker is furnished with a card such as shown in Fig. 1. On it he records daily the number of hours employed,

FIG. 1.

JOHN SMITH. No.

Week ending 6-20-97

S. O.	M.	T.	W.	T.	F	S.	Hrs.	Rate.	Amount.
372	9						9	2.25	2 02
371		8	9		9		26		5 85
63		1					1		22
342						9	9		2 03
Total.	9	9	9		9	9	45		10 12
A. M.									
P. M.									

and makes his own distribution of the time against the single, or several shop orders under which he has been employed during the day. These cards are taken out in the morning and returned at night. He also registers on a Bundy time clock At the end of the week the time reported is checked by the time clock record. The cards are computed vertically and horizontally, so that a workman's distribution of time must be complete, and is checked by the time paid for.

For piece work, a similar form is used, shown in Fig. 2. The workman is provided with a duplicate card for his convenience, but the real record is made by the time keeper and foreman, using the ordinary means of a gangway count and discount pile. This is cumbersome, but no better way has been found.

At the end of the week, the computations having been made, the cards collectively form a complete pay-roll. But, for the sake of convenience, the items are carried forward and concentrated in a pay-roll book in which are recorded the names of the workmen with the amounts due; and, under a separate tabulation, the various items shown on the card distribution are brought together under their common shop order numbers. The two sides of the pay-roll—the wages paid and the distribution—being in balance, the pay-roll forms an accurate source from which ledger charges against the shop orders are made. These shop order accounts are carried in the ledger where they can be referred to when desired, and, at the end of the year, enter into an annual cost sheet with which we will not deal in this paper, but only with running records which are made and exposed as often as the pay-roll is made up.

For the purpose of making ready comparisons, the weekly expenditures appearing in the pay-roll under the various shop orders are then grouped under these headings: Superintendence, including watchman, power, etc.; General Labor, including yards, cupola, cleaning, grinding, etc. Warehouse; Molding; Mounting; Nickeling; Repairs, and Improvements. The castings made are of such uniform character as regards expenditures under the first three of these groups that such differences as exist are ignored. There are occasional exceptions where an undue proportion of gate, extra hazard from loss or breakage, or other conditions, require recognition, to fix individual costs. But for the purpose of this record, these expenditures are charged uniformly against the product by weight, the basis of the charge being 100 lbs. net production of finished castings, deductions being made for all returns to the cupola from whatever cause. The accuracy as to net product is insured by having all returned castings weighed back over the out scales and reported on the daily weight sheet. Liability to error is also decreased by having its weight plainly marked on each truck or barrow, and having the gross and tare both recorded.

A computation on the same basis is also made of the cost of molding; but as this is all done by piece work, and the cost per cwt. naturally varies greatly according to the character of the work in the shop, the figures are only of general interest.

In the other departments— mounting and plating shops — where day-work prevails, the natural costs of the various productions bear so little relation to their weights that comparisons on this basis would be valueless. Therefore, in ascertaining results being obtained in these departments, there is first placed an arbitrary cost price, determined from previous experience, on each stove or piece produced. The weekly outputs of these departments are computed at these assumed costs, and the difference between this computation and the actual pay-roll expenditure is shown as a percentage. This percentage of difference, either above or below the assumed cost of the weekly output, forms a very satisfactory gauge, both for making comparisons and ascertaining exact costs.

FIG. 2.

Name JOHN SMITH, Week ending 6-20-97

S. O. No.	Stove.	Board No.	M.	T.	W.	T.	F.	S.	Total.		Price.	Amount.	Net.
			23	23	23	19	24		112				
86	M H.3B	7	1	3	2		1		7	105	18	18 90	
						1							
84	Job w'k								1		25	25	
													19 15
	86—18	90											
	84—	25											
		19 15											

Those items in the pay-roll which are grouped under Repairs and Improvements are not made a matter of weekly comparison, as expenditures in these directions are considered

* Read before the Western Foundrymen's Association, Wednesday evening, Dec. 15, 1897.

as arising more from general policy than from current shop management. They occupy a proper place in the yearly cost sheet.

Of the purchased material which enters into the production of castings, a comparative record of weekly consumption is kept of iron, coke and steam coal only. Iron and coke are weighed as they come up to the charging floor, and the daily weight sheet shows both the gross and tare of each load. Coal is similarly weighed to the boiler room. The materials so delivered are considered as consumed, although the actual daily consumption may only approximately tally. For obtaining an accurate record, this is found to be more reliable than a system by which the weighing is concurrent with the operation of charging, there being at most only a slight temporary inaccuracy in the weekly totals, due to the variation in the amount of surplus stocks which may remain on the charging floors at the weeks' ends. The weekly report shows the number of pounds of each of these several materials which have been used to produce 100 lbs. of finished product. It also shows the total number of pounds melted, the returns of broken and discarded castings, and the discount,—each computed on the same basis.

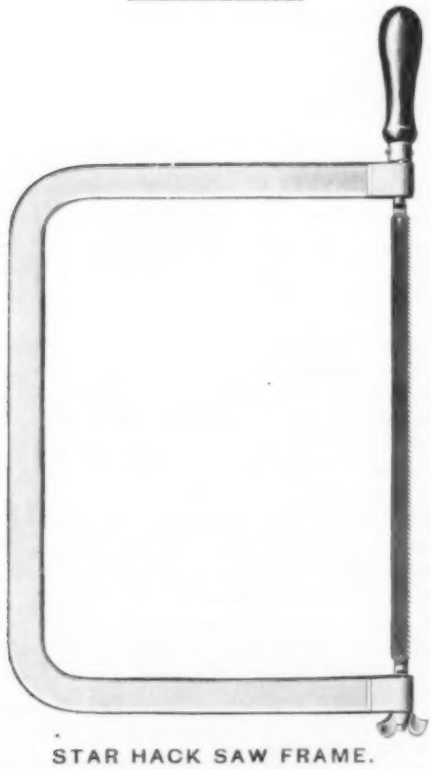
The full report is as follows, the figures being entirely fictitious:

WEEK ENDING JAN. 1, 1898.

Net product					125,000	lbs.
Iron,	per cwt	of	product		94.4	"
Coke,	"	"	"		20.3	"
Coal,	"	"	"		5.7	"
Total melt,	"	"	"		157.	"
Breakage and obsolete,	"	"	"		3.	"
Discount,		"	"		4.5	"
Group I.—Molding					$ .97	
" II.—Superintendence, etc					.124	
" III.—General labor.					.325	
" IX.—Warehouse					.156	
" V.—Mounting department,				Gain, $32.50	9.75	
" X.—Plating department,				Loss, 17 00	4.60	

These reports are gotten out by Thursday, covering the operations of the preceding week. The remedial value of information of this character comes not only from knowing it, but from knowing it quickly.

The cost of clerical work involved in keeping this record, over and above that required for the simplest form of pay-roll accounting, is not such as to affect its usefulness. The method has a natural fluency, one step following another in simple routine, and but little, or no knowledge of the operations of the shop is required to carry correctly the original entries through to the conclusions.



STAR HACK SAW FRAME.

The No. 14 Star hack saw frame of the Miller's Falls Co., 93 Reade st., New York, is shown in the illustration. It is intended for large work, such as cutting off girders, beams, etc. Contractors and others have special work employ them for a variety of uses. The No. 14 is 10 inches deep and takes a 12-inch blade. The No. 13 is 7 inches deep, with a 9-inch blade.

INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our davertisers at once.]

The Steele-Ball Co has been incorporated at Kenosha, Wis., for the manufacture of machinery, by M. H. Ballou and S. A. Cook. The capital stock is $60,000.

The Brownville Iron Works, of Brownville, N. Y., has been incorporated, to manufacture and sell general machinery. The capital stock is $30,000, and the directors for the first year are Darwin B. Gotham, Charles N. Sherman and William H. Hathway, of Watertown.

The Turner Engineering Co., of Marion, O., will erect a boiler making department, and is making inquiries in regard to traveling and jib cranes and complete boiler making equipments.

The International Machinery Co., of Wheeling, W. Va., has been incorporated, with an authorized capital of $100,000. The company will manufacture molds, castings and structural work. The incorporators are C. E. Blue, Jr., L. V. Blue, A. G. Hubbard, W. B. Jones and Gibson Lamb, all of Wheeling.

W. J. English is organizing a company at English, Ind., for the manufacture of edge tools.

The Youngstown Forge Co. has been incorporated by Lewis D. Clark and others, with a capital of $12,000.

The Turner Engineering Co., of Marion, Ind., has been incorporated by George E. Turner, James C. Tobias, George B. Christian, William H. Schaffner, Frank Keeler, Warren G. Harding, George D. Copeland, Edward K. Uhler and Frederick Haberman, with a capital of $100,000. It will sell boilers, machinery, car trucks and construct and equip railways.

The Hewitt Steel Truck Co., Buffalo, has been incorporated, to manufacture car trucks and couplers. Capital $500,000. J. W. Pullman, Q. M., U. S. A., Buffalo, is interested.

J. F. Rodgers & Co., of New York City, have been incorporated to manufacture machinery, with a capital stock of $25,000, and directors, John F. Rogers, M. J. Rogers and John R. Townsend, of New York City.

The Buffalo Engine Works has been incorporated, with a capital of $50,000. Directors: Rudolph F. Sturm, J. E. Barnard and J. A. Schmidt, of Buffalo.

At Atlanta, Ga., proposals will be received until Jan. 5 to furnish two 150 h. p. steam boilers for the new county jail.

The Warrior Machine Works, Birmingham, Ala., is in the market for second hand hoisting engine having double steam cylinders, 14 or 16 inches diameter, 20 to 24-inch stroke.

New Construction:—

The directors of the Ashland Steel Co. met at Ashland last week to discuss further the proposition to put up a rod mill that has been under consideration by three concerns in the Ironton, O., district—the Belfont, Kelly, and Norton Iron Works companies. The question is to come up formally before the three companies in the near future, and in the event of the favorable action anticipated the plant will be built alongside the steel works at Ashland.

The Barnett & Record Co., Minneapolis, Minn., has been awarded the contract for extending ore dock No. 2 belong to the Duluth, Mesaba & Northern Ry. Co. at a cost of about $150,000.

The Dunbar Furnace Co., Dunbar, Pa., is expecting to erect a plant for the utilization of the gas that is the by-product of the coke ovens. It is proposed to utilize this in the generation of electricity, which will then be sold within a radius of 10 miles. Work will probably begin soon after Jan. 1.

Additions, Enlargements, Removals, Etc.:—

The Jackson & Woodin Mfg. Co., of Berwick, Pa., are extending their foundry building by an addition which covers practically one-half the ground of the original foundry. The construction of the new portion will be similar to that of the present building, having steel trusses supporting the roof and carrying the trolleys for transporting material over the foundry floor. The company has given the contract for furnishing

COCHRANE HEATERS
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PHILADA. PA.
MANUFACTURERS.
FOR PURIFYING EXHAUST STEAM
FOR TAKING WATER OUT OF STEAM.
COCHRANE SEPARATORS

and erecting the steel work to the Berlin Iron Bridge Co., of East Berlin, Conn.

The Western Electric Co., Chicago, will begin at once on the construction of six additional stories to building O of their works. The building is at present two stories high and extends over 174 x 56 feet. The construction will be the steel skeleton frame, thoroughly protected with brick and tile. Another peculiarity in the construction will be the use exclusively of wire glass in the windows. The present frontage of the company's buildings is 1,951 feet and the works now cover nearly all the ground bounded by Clinton, Van Buren, Jefferson streets and Jefferson place. The principal buildings are eight stories high. The new building will cost over $100,000.

The Fort Wayne Electric Corporation, Fort Wayne, Ind., will make extensive additions and improvements to its plant. A new three-story steel and brick building, 250 x 90 feet., has been begun. It will be strictly modern in design and will be equipped with the latest machinery, including a large electric traveling crane.

The plant of the Converse Bridge Co , Chattanooga, Tenn., will be enlarged.

The Tacony Iron & Metal Co., Tacony, Pa., will erect an addition to its machine shop to be about 50 x 100 feet, and one-story in height.

The Stockham Mfg. Co., Chicago, is building an addition to its foundry 120 feet in lengthy. The bulk of the business is in light castings for the furniture trade.

Fires and Accidents:—

The new Rosena furnace of the Oliver & Snyder Steel Co. at New Castle was slightly damaged last week by an explosion.

The plant of the United States Iron & Tin Plate Co. at Demmler, Pa., was damaged by fire last week to the extent of several hundred dollars.

In the nail mill of the Oliver Wire Co., of Pittsburg, last week, a fly-wheel 15 feet in diameter exploded, killing one man and seriously injuring several more. The engine ran away, causing the explosion. The damage to the plant was slight.

At Springboro, Pa., the plant of L. C. Graves & Co., carriage manufacturers, was burned Dec. 15, with loss of $12,000.

General Industrial Notes:—

An Ottawa dispatch says: The Canadian Copper Co., which is an American concern, and the Anglo-American Iron Co., also operating under a United States charter, the two companies controlling the output of the nickel and copper mines around Sudbury, Ont., enjoy special legislation domiciling them in Canada on certain conditions, one of which was the establishment of smelting works for the reduction of the ores. It is now asserted that they have shipped ore to the United States to have it smelted. A petition has just been filed in the Department of Justice at Ottawa by Mr. B. B. Osler, Q. C., of Toronto, praying for leave to bring an action against the companies to revoke their Canadian charters.

The Williams Mfg. Co., Kalamazoo, Mich., manufacturer of wooden tanks for all purposes, Manvel windmills and water supply goods, reports that it is busy at present, and has recently put in an electric lighting plant to enable it to work overtime.

The much litigated plant of the West Superior Iron & Steel Co. at West Superior, Wis., it is now expected, will be sold at auction under foreclosure Feb. 4. The original mortgage was 1,339 000 and the indebtedness is now $1,750,000. The Central Trust Co. holding the bonds for John D Rockefeller, is expected to bid in the plant.

The Shoen Pressed Steel Co., of Pittsburg, is building 300 steel ore and coal cars for the Pittsburg & Lake Erie Railway Co.

At a meeting of the stockholders of the Jefferson Iron Works, Steubenville, O., Dec. 15, it was decided to reorganize the company, which has been in a receiver's hands. It is proposed to reduce the capital stock from $1,000,000 to $500,000. A committee was appointed to solicit new capital.

At Columbus, O., Judge Sage of the United States Court rendered judgment in the sum of $1,986 622 for the New York Central Trust Co. against the United States Car Co , of Urbana. Herbert Kenaga, of Cincinnati was appointed as special master and instructed to sell the property within ten days if the sum is not forthcoming in that time. The property consists of several acres of land, with shops, etc., at Urbana, O. The judgment is a mortgage of $1,750,000 given May 1, 1894.

The Central Iron Works, Harrisburg, Pa., have secured a contract for several hundred tons of bridge plates for bridges in Japan.

The Lunkenheimer Co., Cincinnati, has been making preparations for a shipment of valves and machine fittings to South Africa that will aggregate 26,000 pounds. This is a large shipment of this class of goods. A consignment has just been made of 4,000 pounds of brass fittings to Sweden by the company. The concern has been running full time, 56 hours a week, with 250 men, which is up to the best of the past five years.

The Poultney Foundry & Engineering Co., of Youngstown, O., made an assignment Dec. 17. It is expected that the assets will pay the liabilities, which were placed at $15,000.

The Lackawanna Iron & Steel Co., of Scranton, Pa., has leased the Bird Coleman furnaces at Cornwall and the North Cornwall furnace. These three furnaces have been idle several years. They will go into blast in January.

The Watts Steel & Iron Syndicate, Middlesborough, Ky., put one blast furnace into operation Dec. 9 after an idleness of more than a year. The mixture is low phosphorus, Ducktown ore and Cambria with Stonega coke for fuel. The pig iron is guaranteed under .40 in phosphorus, and it is claimed has peculiar merits. The former agents of the Watts Syndicate, Rogers, Brown & Co., have been reappointed for the Central and Western districts. No definite plans have yet been matured in regard to starting the large steel plant connected with the Watts furnaces.

Furnace B, of the Carnegie blast furnace plant at Braddock, has been taken out of blast. It will be relined and enlarged at the bosh. New hot blast stoves will be erected. A new hoist for continuous conveyance of ore from the stock-yards to the top of the furnace will also be put in, and a new battery

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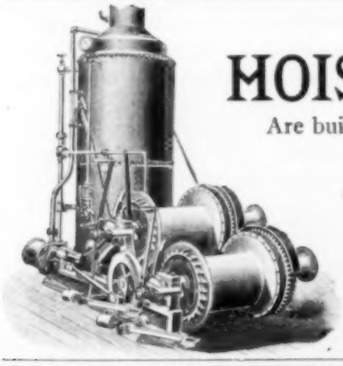

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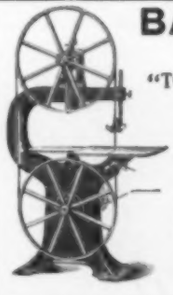

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of Cahall boilers. Furnace B has been running a year and ten months. The changes will probably be completed by the end of February.

Thos. Carlin's Sons, of Allegheny, have an order from a large steel plant for what is believed to be one of the largest grinding pans ever built. It is 10 feet in diameter and weighs about 25 tons. It will contain a number of new features, saving in labor cost.

The Illinois Steel Co. has taken the order of the Oregon Short Line for 15,000 tons of 70-lb. steel rails January and February delivery. The railroad company may increase the order to 35,000 tons. The main line will be relaid from Salt Lake to Huntington.

We have it on the best authority that the proposed consolidation of New Castle interests making steel and tin plate will not take place, in so far at least as concerns the tin plate mill now in operation there. This interest feels after mature consideration that nothing commensurate has been offered against a complete sinking of their individuality and brands in a concern which has not yet had an opportunity to impress its name on the trade. We are advised that beyond this, there has been some question as to whether the deal as originally blocked out, could be consummated under the laws of the State. The tin plate trade has looked upon the suggested combination with some misgivings, and satisfaction will probably be expressed in many quarters that it is not to be.—[Tin and Terne.

The Westinghouse Electric & Mfg. Co., of Pittsburg, has received the contracts for the electrical equipment of the street railways of Glasgow, Great Britain, and of the lighting plant of Malaga, Spain. The company has taken contracts worth $1,000,000 from Niagara Falls and vicinity. They are for two 300 h. p., two-phase induction motors for the Buffalo & Niagara Falls Electric Light & Power Co.; additions to the transfer station for the Niagara Electro-Chemical Co., consisting of three 235 h. p., two phase rotary transformers, one 175 kilo watt rotary transformer, and six 133 h. p., air-cooled-oil converters, with 3,000 alterations; also various electrical appliances for the Acetylene Light & Power Co., and the Mathieson Alkali Co.; and five 5,000 h. p generators for the Cataract Construction Co. The Westinghouse company has just started the manufacture of six 750 h. p. direct current generators of 300 volts for the Niagara Falls Hydraulic Power & Mfg. Co.

The rolling mill of the Dover (N. J) Iron Co. is being enlarged by the addition of a frame structure to accommodate a new 20-inch train of rolls. At present the limit in sizes is 2½ inches for round bars, 2¼ inches for square bars, and four inches in width for flats. With the new rolls the mill will be able to turn out five-inch bars in rounds and squares, and bars

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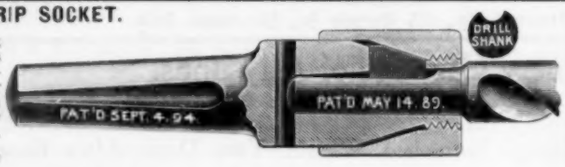

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For Iron and Steel Furnaces, Glass Furnaces, etc.
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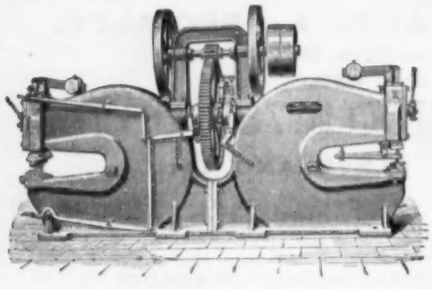

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Belt, Steam or Electrically Driven.
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seven inches wide in flats. The mill will also be able to turn out billets for car axles.

The case of the Sharpsville Furnace Co., Sharpsville, Pa., against Corrigan, McKinney & Co. has been carried to the Supreme Court of the United States. The case was removed to the United States Court at Pittsburg by defendants, who are residents of Cleveland, and tried last May, when a verdict for $16,000 was given plaintiffs. An appeal was taken to the United States Circuit Court of Appeals at Philadelphia, and at the trial of the case in October the judgment was affirmed. No appeal lies from this last court, and the defendants last week made application to the Supreme Court of the United States for a special writ of certiorari to bring the case into that court for review and final determination.

The Slaymaker-Barry Co., South Connellsville, Pa., has increased its capitalization from $180,000 to $250,000. Considerable additions will be made.

H. K. Porter & Co., of Pittsburg, builders of light locomotives, have received an order for two 27,000-pound engines from the Cambria Iron Co., of Johnstown, Pa. These engines are of the six-wheel compressed air type, and each engine will have two air tanks giving a working pressure of 7,000 pounds. The engines are expected to haul heavy trains at least two miles with one change of air.

The Ashland Iron & Steel Co., Ashland, Wis., has blown in its charcoal blast furnace at Ashland, Wis., after a shutdown of four months. The furnace has been remodeled.

The Gendron Iron Wheel Co., Toledo, O., issueds a statement which shows that since 1893 the company has paid over $400,000 of a total indebtedness of $500,000.

The Wilbraham Baker Blower Co., Philadelphia, has received an order for eight large gas exhausters for the new by-product coke oven plants of the Semet-Solvay Co., Ensley, Ala., and Wheeling, W. Va.

Orders aggregating 50 tons of aluminum a month have been received from abroad by the Pittsburg Reduction Co., chiefly for army equipment. Russia is the largest consumer. Heavy metal on military uniforms is being displaced by aluminum, and canteens and cooking utensils are now being made of aluminum.

There is some talk at Akron, O., of raising money for the purchase of the old Akron Iron & Steel Co. rolling mill and starting it. Some of the old employes have offered to make subscriptions, but the amount needed is larger than there is any likelihood of securing.

It is expected that the new machine shop at the works of the American Steel Barge Co., West Superior, Wis., will be completed about Jan. 1. The shop is now roofed, and a Westinghouse generator of 150 k. w., as well as an engine and several motors are on the ground. Work is now well under way on both the steamer and tow barge that are to be built during the winter.

The Gus engine, for gas or gasoline, has been brought out by the Carl Anderson Co., Chicago. It is made in both horizontal and vertical styles. The valve motion has no gear wheels, but the valve is operated automatically every alternate revolution by a cam to the main shaft.

EXCURSION RATES.

Via Pennsylvania Lines for Christmas and New Year.

Following the annual custom, Ticket Agents of the Pennslyvania Lines will sell excursion tickets Dec. 24, 25 and 31, 1897, and Jan. 1, 1898, for the Christmas and New Year holidays. Tickets will not be sold to adults for less than 25 cents, nor to children for less than 15 cents. Return limit of excursion tickets will include Jan. 4, 1898. For rates, time of trains, and further information please apply to nearest Ticket Agent of the Pennsylvania Lines.

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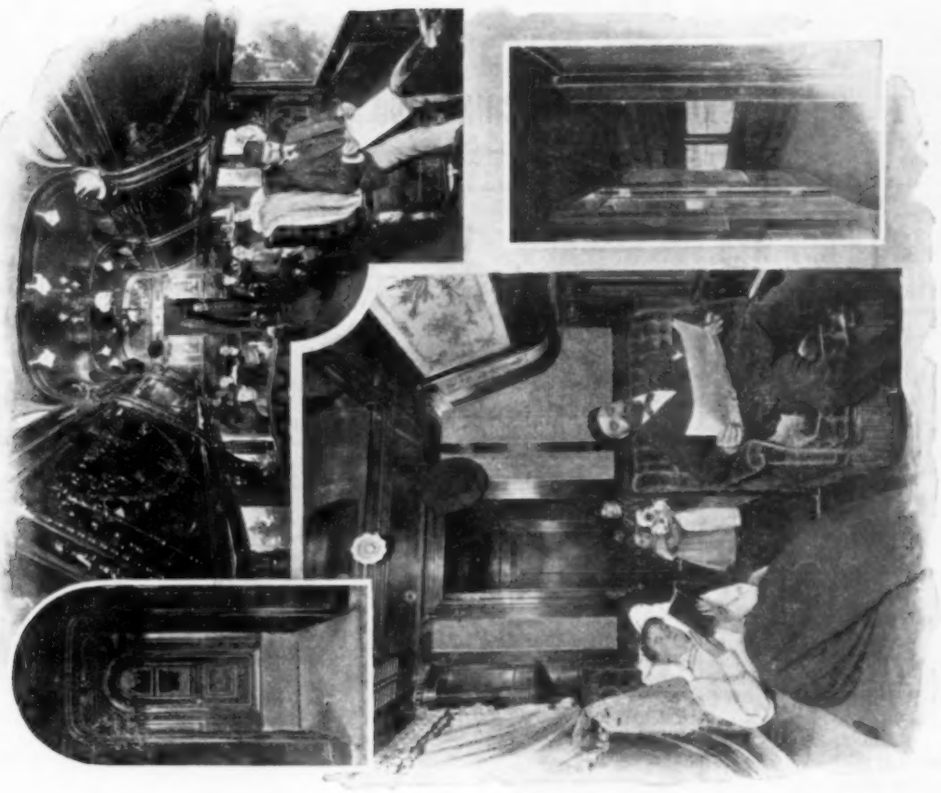

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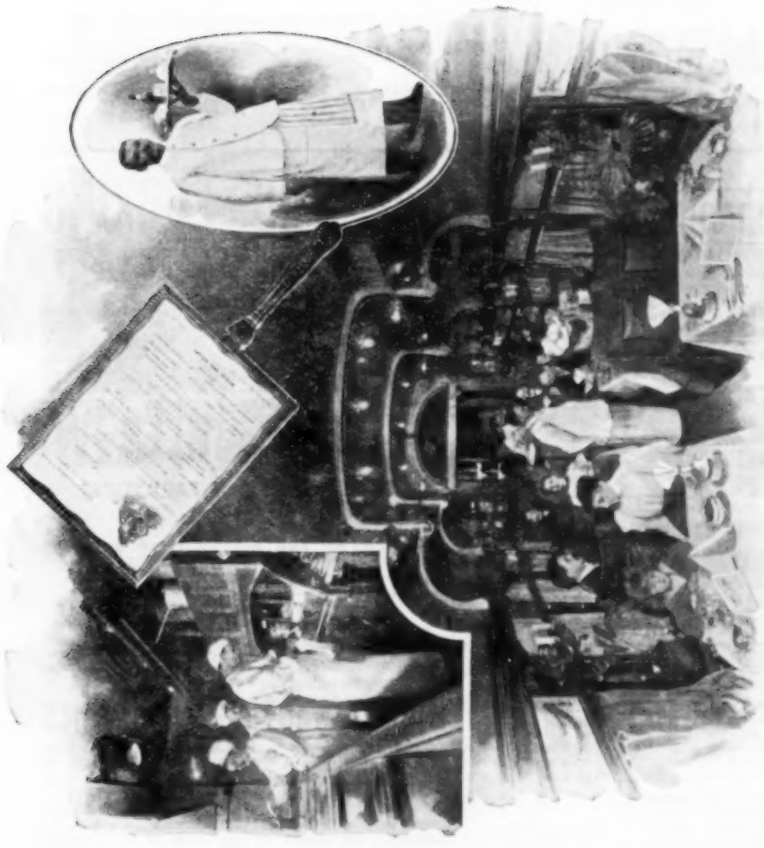

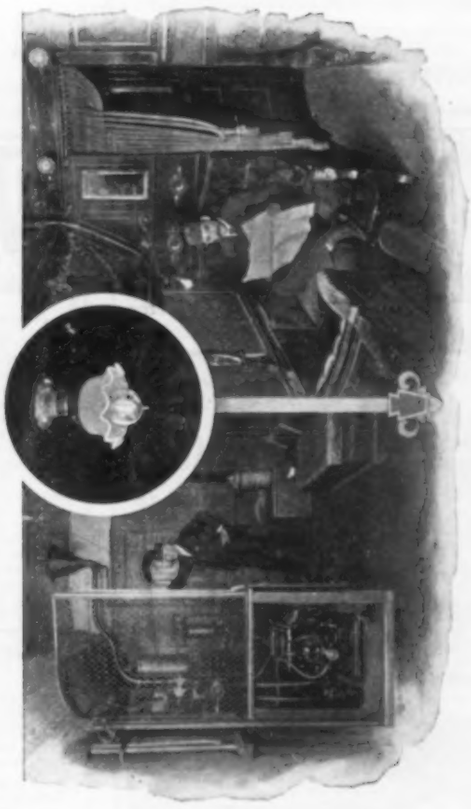

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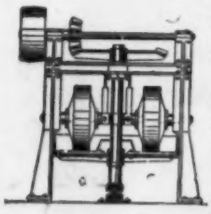

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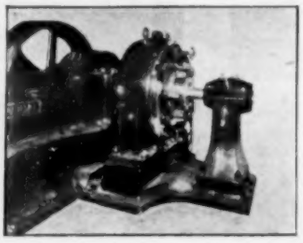

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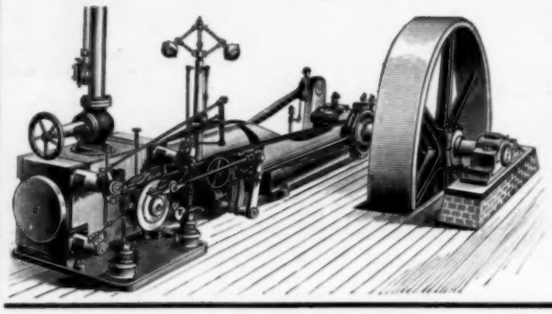

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Pittsburgh and Bellaire	† 7:10 am	†12:10 pm
Salem and Pittsburg	* 8:00 am	* 8:30 pm
Pittsburgh, Bellaire and East	† 3:15 pm	† 6:25 pm
Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	* 5:00 pm	* 8:40 am
Philadelphia and New York	*11:10 pm	* 4:30 am
Baltimore and Washington	*11:10 pm	* 4:30 am
Alliance and Pittsburgh	*11:10 pm	* 4:30 am

Mt. Vernon and Pan-Handle Route

FROM CLEVELAND TO	LEAVE	ARRIVE
Xenia and Cincinnati	* 8:50 am	* 5:30 pm
Akron and Columbus	* 8:50 am	* 5:30 pm
Akron and Columbus	† 1:40 pm	†12:10 pm
Col. Cin. Ind. & St. L.	‖ 8:00 pm	* 7:30 am
Col. Cin. Ind. & St. L.	‡ 11:20 pm	.....

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Depot foot of So. Water St. City Office 241 Superior St.	Arrive.	Depart.
Valley Jctn. & Way Stations	*6:20 P M	*7:10 A M
Akron, Canton & Valley Jct	*10:05 A M	*3:30 P M
Akron, Canton & Chicago	*8:10 A M	*6:45 P M
Akron, Canton & Wooster, Defiance, Garrett, Marietta, Wheeling, Washington, D. C., and Baltimore	†2:25 P M	†11:00 A

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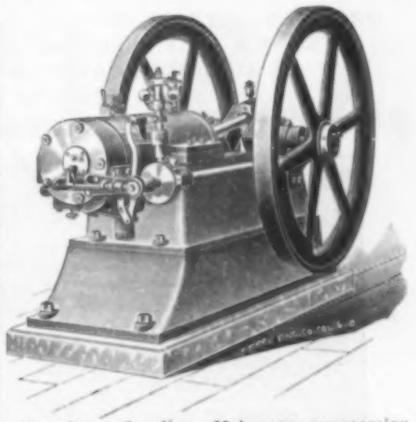

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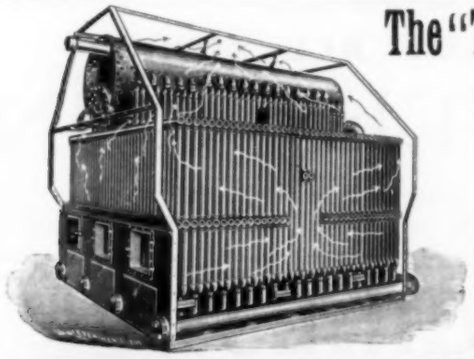

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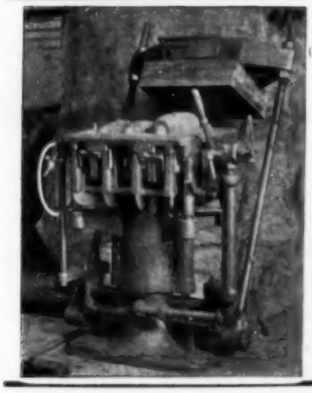

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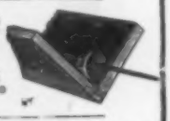

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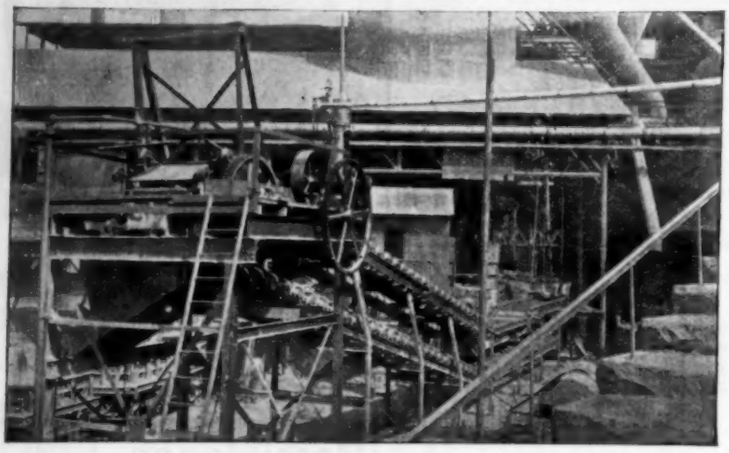

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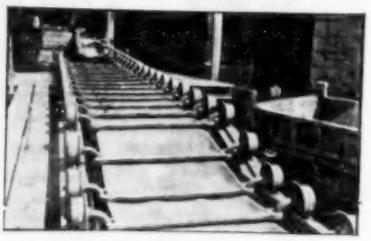

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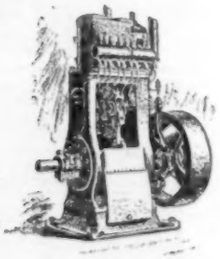

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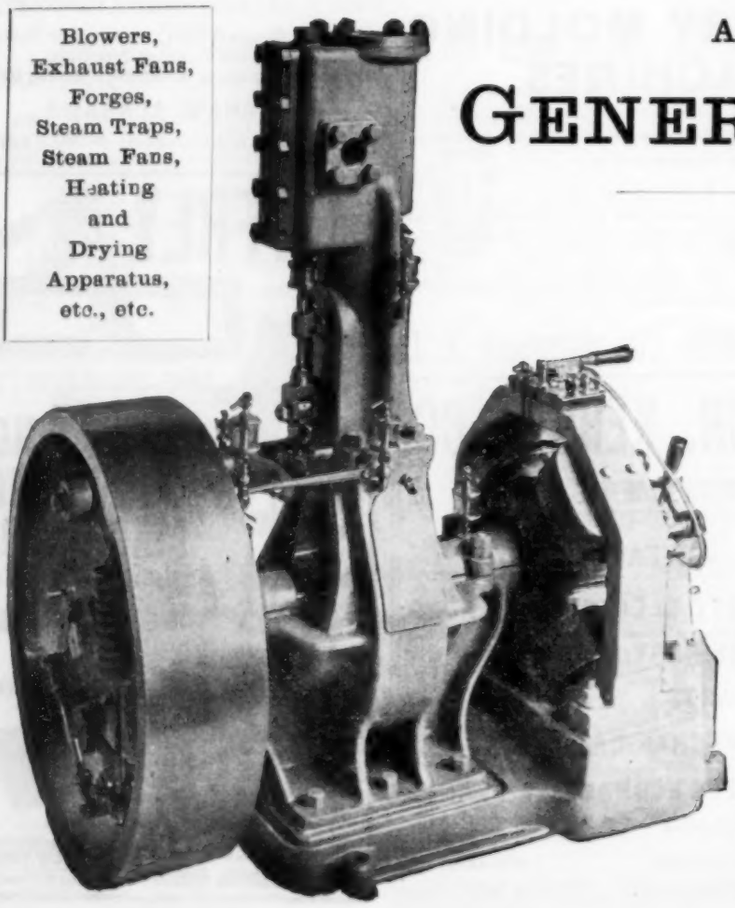

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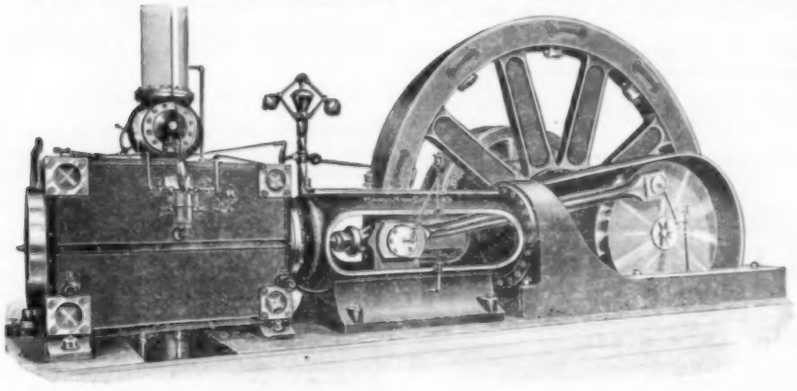

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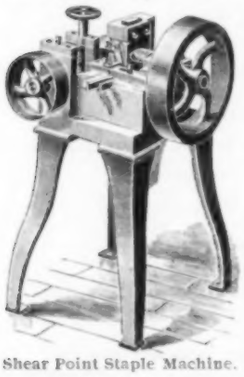

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B. F. Sturtevant Co., Boston.

Dynamos—
Westinghouse Electric & Mfg. Co., Pitts
Westinghouse, Church, Kerr & Co., New York City.
Jeffrey Mfg. Co., Columbus, O.
Card Electric Co., Mansfield, O.
Fisher Electrical Mfg. Co., Detroit, Mich.

Eave Troughs and Conductors—
Berger Mfg. Co., Canton, O.

Electrical Supplies—
Westinghouse Electric & Mfg. Co., Pittsburg.
Westinghouse, Church, Kerr & Co., New York City.
Card Electric Co., Mansfield, O.
Fisher Electrical Mfg. Co., Detroit, Mich.

Elevators—
The Lane & Bodley Co., Cincinnati, O.

Elevating and Conveying Machinery—
Heyl & Patterson, Pittsburg, Pa.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Machinery Co., Chicago, Ill.

Emery and Corundum Wheels—
J. Wendell Cole, Columbus and Chicago.
Sterling Emery Wheel Mfg. Co., Tiffin, O.

Emery Wheel Machinery—
J. Wendell Cole, M. E., Columbus, O., or Chicago, Ill.
C. H. Besly & Co., Chicago, Ill.
Sterling Emery Wheel Mfg. Co., Tiffin, O.

Engineers and Contractors—
Wellman Seaver Engineering Co., Cleveland, O.
Edward E. Erikson, Pittsburg, Pa.
Westinghouse, Church, Kerr & Co., Pittsburg Pa.
Heyl & Patterson, Pittsburg, Pa.
Meehan Boiler & Construction Co., Lowellville, Ohio.
Sharpsville Foundry and Machine Co., Sharpsville, Pa.
Pittsburg Valve & Machine Co., Ltd., Allegheny, Pa.

Engineers' Supplies—
C. H. Besly & Co., Chicago, Ill.
Jenkins Bros., New York City.
The Lunkenheimer Co., Cincinnati, O.

Engravers and Electrotypers—
Cleveland Electrotype Co., Cleveland, O.
Central Electrotype & Engraving Co., Cleveland, O.
National Engraving Co., Cleveland, O.

Engine Lathes—
Lodge & Shipley Machine Tool Co., Cincinnati, Ohio.
U. Baird Machinery Co., Pittsburg, Pa.
Edwin Harrington & Son Co., Philadelphia, Pa.
Dietz Schumacher & Boye Cincinnati, O.

Engine Packing—
C. H. Besly & Co., Chicago, Ill.

Engines (Steam)—
Wm. Tod & Co., Youngstown, O.
B. F. Sturtevant Co., Boston, Mass.
The Edward P. Allis Co,, Milwaukee, Wis.
The Hooven, Owens & Rentschler Co.
Lane & Bodley Co. Cincinnati, O.
Westinghouse, Church, Kerr & Co., New York City.
W. H. Bosworth, Cleveland, O.
Wm. C. Thayer, Cleveland. O.
Walker Bros., Lansing, Mich.
Heilman Machine Works, Evansville, Indiana.
Pittsburg Valve & Machine Co., Ltd., Allegheny, Pa.

Exhaust Heating Apparatus—
B. F. Sturtevant Co., Boston, Mass.

Fans—
B. F. Sturtevant Co., Boston, Mass.
W. H. Bosworth, Cleveland, O.

Feed Water Heaters and Purifiers—
Stilwell-Bierce & Smith-Vaile Co., Dayton, O.
Harrison Safety Boiler Works, Philadelphia, Pa.

Files, Makers of—
C. H. Besly & Co., Chicago, Ill.

Fire Brick and Clay—
J. V. Rose, Sharon, Pa.
Union Mining Co., Mt. Savage, Md.
Reese, Hammond & Co., Bolivar, Pa.
Clearfield Fire Brick Co., Clearfield, Pa.
Dover Fire Brick Co., Cleveland.
Stuart Fire Brick Co., Pittsburg, Pa.
Diamond Fire Brick Works, Akron, O.

Fire Proof Covering—
C. H. Besly & Co., Chicago, Ill.

Foot and Power Lathes—
Lodge & Shipley Machine Tool Co.. Cincinnati
U. Baird Machinery Co., Pittsburg, Pa.
Edwin Harrington Son & Co., Philadelphia, Pa.
Dietz, Schumacher & Boye, Cincinnati, O.

Foundries—
Wm. Tod & Co., Youngstown, O.
Lorain Foundry Co. Lorain, O.
Seaman, Sleeth Co., Pittsburg, Pa.
The Lane & Bodley Co., Cincinnati, O.
Hooven, Owens & Rentschler Co., Hamilton, O
Fulton Steam Boiler Wks. & Fdy., Richmond, Ind.
W. A. Jones Foundry Co., Chicago.
Jeffrey Mfg. Co., Columbus. O.

Foundry Supplies—
Clearfield Fire Brick Co.. Clearfield, Pa.
Stuart Fire Brick Co., Pittsburg, Pa.
The Ohio Sand Co., Conneaut, O.
Union Mining Co., Mt. Savage, Md.
Dover Fire-Brick Co., Cleveland, O.
Reese-Hammond & Co., Bolivar, Pa.
Tabor Mfg. Co., Elizabeth, N. J.
Crescent Machine Co., Leetonia, O.

Forgings—
Cleveland City Forge & Iron Co., Cleveland.
Bethlehem Iron Co., South Bethlehem, Pa.

Friction Metal—
Magnolia Metal Co., New York City.

Furnaces—
Brightman Furnace Co., Cleveland, O.
Playford Stoker Co., Cleveland, O.

Furnace Linings—
Union Mining Co., Mt. Savage, Md.

Fuel Oil Burners—
W. S. Rockwell & Co., New York City.

Galvanizers—
Cleveland Galvanizing Works, Cleveland, O.
Ætna-Standard Iron & Steel Co., Bridgeport, O.

Gas Engines—
Charter Gas Engine Co., Sterling, Ill.
Columbus Machine Co., Columbus, O.

Gear Cutting—
The R. D. Nuttall Co., Allegheny, Pa.

Grindstones—
C. H. Besly & Co., Chicago, Ill.

Graphite Paint—
Jos. Dixon Crucible Co., Jersey City N. J.,

Gray Iron Castings—
W. A. Jones Foundry Co., Chicago, Ill.
The Lane & Bodley Co., Cincinnati, O.

Grip Sockets—
M. L. Andrew & Co., Cincinnati, O.

Hack Saws—
Millers Falls Co., New York City.

Hoists—
Edwin Harrington Son & Co., Philadelphia.
Moore Mfg. Co.. Cleveland, O.
Reading Crane & Hoist Works, Reading, Pa.
The Lane & Bodley Co., Cincinnati, O.
Burr Mfg. Co., Cleveland, O.

Heaters and Purifiers—
Harrison Safety Boiler Works, Philadelphia.
Stilwell-Bierce & Smith-Vaile Co., Dayton, O.

Heating and Ventilating Apparatus—
B. F. Sturtevant Co., Boston.

Heavy Hardware—
C. H. Besly & Co., Chicago, Ill.

Hoisting Engines—
The Edward P. Allis Co., Milwaukee, Wis.
Earle C. Bacon, New York City.
The Lane & Bodley Co., Cincinnati, O.
Lidgerwood Mfg. Co., New York City.

Hoisting Machinery—
Link Belt Machinery Co., Chicago, Ill.
Reading Crane & Hoist Works, Reading, Pa.
Jeffrey Mfg. Co., Columbus, O.
The Lane & Bodley Co., Cincinnati, O.
Case Mfg. Co., Columbus, O.
Earl C. Bacon, New York City.
Burr Mfg. Co., Cleveland, O.

Hydraulic Machinery—
Stilwell-Bierce & Smith-Vaile Co., Dayton, O.

Ingot Molds—
Lorain Foundry Co., Lorain, O.

Injectors—
C. H. Besly & Co., Chicago, Ill.
The Lunkenheimer Co., Cincinnati, O.

Insurance Companies—
Hartford Steam Boiler I. & I. Co., Hartford, Ct

Iron Buildings—
Shiffler Bridge Co., Pittsburg, Pa.

Iron Nails and Steel—
Bethlehem Iron Co., South Bethlehem, Pa.
C. H. Besly & Co., Chicago, Ill.
Cambria Iron Co., Johnstown, Pa.
E. H. Stroud & Co., Chicago, Ill.

Iron and Steel Roofing—
Sykes Iron & Steel Roofing Co., Niles, O.
Berger Mfg. Co., Canton, O.
Ætna-Standard Iron & Steel Co., Bridgeport, O

Iron Ore—
Lake Superior Consolidated Iron Mines New York City, N. Y.
Oglebay, Norton & Co., Cleveland.
Pickands, Brown & Co., Chicago, Ill.
M. A. Hanna & Co., Cleveland, O.
Chas. F. Rand, Prest., New York City.

Iron Working Tools—
Toledo Machine & Tool Co., Toledo, O.
H. Bickford, Lakeport, N. H
Lodge & Shipley Machine Tool Co., Cincinnati.
C. H. Besly & Co., Chicago, Ill.
John Adt & Son, New Haven, Conn.
U. Baird Machinery Co., Pittsburg, Pa.
Edwin Harrington Son & Co., Philadelphia
Wm. Glader, Chicago, Ill.
Fox Machine Co., Grand Rapids, Mich.
Wm. C. Thayer, Cleveland, O.
M. L. Andrew & Co., Cincinnati, O.

Link Belting—
The Jeffrey Mfg. Co., Columbus, O.
Link-Belt Machinery Co., Chicago, Ill
Heyl & Patterson, Pittsburg, Pa.

Lathes—
Lodge & Shipley Machine Tool Co., Cincinnati
U. Baird Machinery Co., Pittsburg, Pa.
Edwin Harrington, Son & Co., Philadelphia.
Wm. Glader, Chicago, Ill.

Lubricators—
The Lunkenheimer Co., Cincinnati, O.

Machinists' Tools and Supplies—
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C. H. Besly & Co., Chicago, Ill.
U. Baird Machinery Co., Pittsburg, Pa.
Bertsch & Co., Cambridge City, Ind.
Lodge & Shipley Machine Tool Co., Cincinnati.
Wm. Glader, Chicago, Ill.

Machine Screws—
C. H. Besly & Co., Chicago, Ill.

Machine Shops—
Toledo Machine & Tool Co., Toledo, O.
The R. D. Nuttall Co., Allegheny, Pa.
The Lane & Bodley Co., Cincinnati, O.
Pittsburg Valve & Machine Co., Ltd., Allegheny, Pa.

Machinery and Tool Steel—
W. H. Bosworth, Cleveland, O.

Magnesia Covering—
C. H. Besly & Co., Chicago, Ill.

Manufactured Iron & Steel—
Bourne-Fuller & Co., Cleveland, O.
Cleveland Rolling Mill Co., Cleveland, O.
Cambria Iron Co., Johnstown, Pa.
Junction Iron & Steel Co., Mingo Junction, O.
Ætna-Standard Iron & Steel Co., Bridgeport, O.

Metal Bearings—
North American Metaline Co., Long Island City, N. Y.

Metal Stamping—
Oliver P. Clay Co., Cleveland, O.

Milling Machines—
Lodge & Shipley Machine Tool Co., Cincinnati.
U. Baird Machinery Co., Pittsburg, Pa.
Fox Machine Co., Grand Rapids, Mich.

Mining Machinery—
The Bucyrus Co., South Milwaukee, Wis.
C. H. Besly & Co., Chicago, Ill.
The Edward P. Allis Co., Milwaukee, Wis.
Earle C. Bacon, New York City.
The Lane & Bodley Co., Cincinnati, O.
Gates Iron Works, Chicago, Ill.
W. H. Bosworth, Cleveland, O.
Jeffrey Mfg. Co., Columbus, O.
Lidgerwood Mfg. Co., New York City.

Motors—
Westinghouse, Church, Kerr & Co., New York City.
Westinghouse Electric & Mfg. Co., Pittsburg.
Card Electric Co., Mansfield, O.
Fisher Electrical Mfg. Co., Detroit, Mich.

Molding Machines—
Tabor Mfg. Co., Elizabeth, N. J.

Molding Sand—
Ohio Sand Co., Conneaut, O.

Oilless Bearings—
North American Metaline Co., Long Island, City, N. Y.

Oil Burners—
W. S. Rockwell & Co., New York City.

Oil Cups—
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The Lunkenheimer Co., Cincinnati, O.

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The Lunkenheimer Co., Cincinnati, O.

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Gates Iron Works, Chicago, Ill.
Jeffrey Mfg. Co., Columbus, O.

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Jenkins Bros., New York City.

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Jos. Dixon Crucible Co., Jersey City, N. J.

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Gobeille Pattern Co., Cleveland, O.

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Harrington & King Perforating Co., Chicago, Ill
Aitchison Perforated Metal Co., Chicago.
A. J. Beckley & Co., Garwood N. J.

Phosphor Bronze Castings—
Lorain Foundry Co., Lorain, O

Pig Iron—
Pickands, Brown & Co., Chicago, Ill.
Clinton Iron & Steel Co., Pittsburg.
Forster Waterbury & Co., Chicago, Ill.
W. H. Bosworth, Cleveland, O.
Bourne-Fuller Co. Cleveland, O.
M. A. Hanna & Co., Cleveland, O.
R. H. Stroud & Co., Chicago, Ill
Miller, Wagoner & Bentley, Chicago, Ill.
Rogers, Brown & Co., Cincinnati, O.
Superior Charcoal Iron Co., Detroit, Mich.

Pipe Covering—
C. H. Besly & Co., Chicago, Ill.

Pipe
W. H. Bosworth, Cleveland, O.

Planers—
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Plates—
Enterprise Boiler Co., Youngstown, O.

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Clayton Air Compressor Works, New York.

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B. F. Sturtevant Co., Boston, Mass.

Power Presses—
Bertsch & Co., Cambridge City, Ind.
Long & Allstattar Co., Hamilton, O.

Power Transmission Machinery—
Jeffrey Mfg. Co., Columbus, O.
The Lane & Bodley Co., Cincinnati, O.

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Toledo Machine & Tool Co., Toledo, O.
Bertsch & Co., Cambridge City, Ind.
C. H. Besly & Co., Chicago, Ill.
Long & Allstatter Co., Hamilton, O.

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W. H. Bosworth, Cleveland, O.

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W. A. Jones Foundry Co., Chicago, Ill.
The Lane & Bodley Co., Cincinnati, O.

Pumps (Steam)—
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Stilwell-Bierce & Smith-Vaile Co., Dayton, O.
W. H. Bosworth, Cleveland, O.
Pittsburg Valve & Machine Co., Ltd., Allgheny, Pa.

Punches—
Walker Bros., Lansing, Mich.

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Edward Brown, Philadelphia, Pa.

Railway Supplies—
Cleveland City Forge & Iron Co., Cleveland.

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Rand Drill Co., Chicago, Ill.
The Ingersoll-Sergeant Drill Co., New York.

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The Lloyd Booth Co., Youngstown, O.

Roofs—
Shiffler Bridge Co., Pittsburg.

Safety Lift Blocks—
Burr Mfg. Co., Cleveland, O.

Sand and Chill Rolls—
The Lloyd Booth Co., Youngstown, O.
Lorain Foundry Co., Lorain, O.
Seaman, Sleeth Co., Pittsburg, Pa.

Saws—
Peter Gerlach & Co., Cleveland.

Screens for Coal Ore, Etc.
Robt. Aitchison Perforated Metal Co., Chicago.
Harrington & King Perforating Co., Chicago.
Jeffrey Mfg. Co., Columbus, O.

Screws—
C. H. Besly & Co., Chicago, Ill.
Upson Nut Co., Cleveland, O.
Chicago Screw Co., Chicago, Ill.

Semi-Steel—
The King & Andrews Co.,

Shafting—
The Lane & Bodley Co., Cincinnati, O.

Shearing and Punching Machinery—
Bertsch & Co., Cambridge City Ind.
Toledo Machine & Tool Co., Toledo, O.
Long & Allstatter Co., Hamilton, O.
Fox Machine Co, Grand Rapids, Mich.

Sheet Iron—
Cleveland Rolling Mill Co., Cleveland.
Ætna-Standard Iron & Steel Co., Bridgeport, O.
R. H. Stroud & Co., Chicago, Ill.

Special Machinery—
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Edwin Harrington Son & Co., Philadelphia.
Perkins Machine Co., Boston, Mass.

Steam Boiler Inspectors—
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

Steam Pipe and Boiler Covering—
C. H. Besly & Co., Chicago Ill

Steam Packing—
C. H. Besly & Co., Chicago, Ill.

Steam Shovels and Dredges—
The Bucyrus Co., South Milwaukee, Wis.
Marion Steam Shovel Co., Marion, O.

Steam Specialties—
C. H. Besly & Co., Chicago, Ill.

Steel—
Otis Steel Co., Cleveland, O.
Miller, Wagoner & Bentley, Chicago, Ill.
R. H. Stroud & Co., Chicago, Ill.

Steel Castings—
W. H. Bosworth, Cleveland, O.
The King & Andrews Co., Chicago, Ill.
Otis Steel Co., Cleveland, O.

Steel Rails, Blooms and Billets—
Cleveland Rolling Mill Co., Cleveland
Bethlehem Iron Co., South Bethlehem,
Cambria Iron Co., Johnstown, Pa.

Steel Stamps and Stencils—
J. H. Fleharty & Co., Cleveland.

Stokers—
Playford Stoker Co., Cleveland, O.
Brightman Furnace Co., Cleveland, O.
Westinghouse, Church, Kerr & Co., New York City.

Tackle Blocks—
Burr Mfg. Co., Cleveland, O.

Tanks—
Enterprise Boiler Co., Youngstown, O.
Meehan Boiler & Construction Co., Lowellville, Ohio.
Williams Mfg. Co., Kalamazoo, Mich.

Tinning Machinery—
W. H. Bosworth, Cleveland, O.
The Lloyd Booth Co., Youngstown, O.

Tin Plate—
Ætna-Standard Iron & Steel Co., Bridgeport, O

Tin and Terne Plates—
B. P. Crane & Co., Chicago, Ill
R. H. Stroud & Co., Chicago, Ill.

Tool Steel—
C. H. Besly & Co., Chicago, Ill.

Transmission Machinery—
Link-Belt Machinery Co., Chicago, Ill.
The Lane & Bodley Co., Cincinnati, O.
Jeffrey Mfg. Co., Columbus, O.

Tube Welding—
S. Fix Sons, Cleveland.

Turnbuckles—
Cleveland City Forge & Iron Co., Cleveland.
W. H. Bosworth, Cleveland, O.

Twist Drills—
C. H. Besly & Co., Chicago, Ill.

Valves—
C. H. Besly & Co., Chicago, Ill.
Jenkins Bros., New York City.
The Lunkenheimer Co., Cincinnati, O.

Ventilating Fans—
B. F. Sturtevant Co., Boston Mass.

Wheelbarrows—
Akron Cultivator Co., Akron, O.
Lansing Wheelbarrow Co., Lansing, Mich.

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John Adt & Son New Haven Conn.
Wm. Glader, Chicago, Ill.

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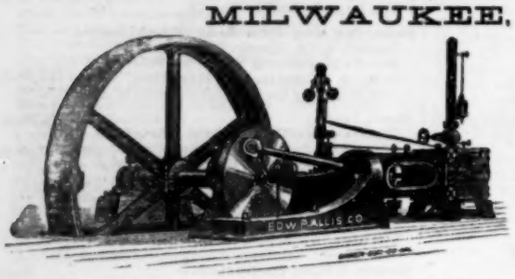

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Is one of the requisites of satisfactory results. In the expansion of business which is confidently expected in the United States in the very near future, advertisers who have made themselves regularly prominent in the past two years will be first to reap the rewards of persistent publicity.

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The star (*) indicates that the adv. appears alternate weeks; the dagger (†) once a month; the double dagger (‡) once in three weeks; the parallel (‖) three times out of four.

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IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

Special low-phosphorus hard Ore, Bessemer	$3 40@ 3 46
No. 1 Specular, Bessemer	3 05@ 3 17
No. 1 Bessemer hematite	2 60@ 2 90
Hematites No. 1 non-Bessemer	2 00@ 2 25
No 1. Specular, non-Bessemer	2 40@ 2 60

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Bessemer	$ 10 15
No. 1 Strong Foundry	10 50@ 10 75
No. 2 Strong Foundry	..... 10 15
Gray Forge, red short	..... 9 00
Gray Forge, neutral	9 15
No. 1 American Scotch	10 65@ 10 75
No. 2 American Scotch	10 15@ 10 25
Lake Superior Charcoal	..... 12 00
PITTSBURG:	
No. 1 Foundry	$10 75@ 10 90
No. 2 Foundry	10 25@ 10 40
Gray Forge	... ... 9 00
White and Mottled	... ... 8 75
Warm Blast Charcoal	13 00@ 13 50
Cold Blast Charcoal	... ... 16 00
Bessemer	10 00@ 10 15
CHICAGO:	
Lake Superior Charcoal	$12 50@$13 00
Local Coke Foundry No. 1	11 00@ 11 50
Local Coke Foundry No. 2	10 50@ 11 00
Local Coke Foundry No. 3	10 25@ 10 50
Local Scotch Foundry No. 1	11 50@ 12 00
Local Scotch Foundry No. 2	11 00@ 11 50
Local Scotch Foundry No. 3	10 50@ 11 00
Southern Coke No. 1	11 00@ 11 25
Southern Coke No. 2	10 60@ 10 85
Southern Coke No. 3	10 35@ 10 60
Southern No. 1 Soft	11 00@ 11 25
Southern No. 2 Soft	10 60@ 10 85
Southern Silveries	11 25@ 11 50
Jackson Co. Silveries	72 50@ 14 50
Ohio Silveries No. 1	@ .....
Ohio Strong Softeners	12 00@ 12 25
Alabama Car Wheel	16 00@ 17 00
Malleable Bessemer	10 75@ 11 00
Coke Bessemer	11 50@ 12 00
CINCINNATI (reported by Rogers, Brown & Co.)	
Southern Coke No. 1, Foundry	$ 10 00
Southern Coke No. 2 and No. 1 Soft	... . 9 75
Hanging Rock Coke, No 1	... . 9 45
Hanging Rock Charcoal No. 1, Fdy	14 50@ 15 50
Tennessee Charcoal No 1	12 50@ 13 00
Jackson County Silvery No 1	12 50@ 13 00
Southern Coke, Gray Forge	... . 9 25
" " Mottled	... . 9 00
Standard Georgia Car Wheel	14 25@ 15 00
Tennessee " "	13 00@ 14 00
Lake Superior " "	14 25@ 14 50
BUFFALO:	
No. 1 Foundry Strong Coke Iron Lake Superior Ore	... . 11 25
No. 2 Foundry Strong Coke Iron Lake Superior Ore	... . 10 75
Ohio Strong Softener No. 1	... . 11 75
Jackson Co. Silvery No. 1	... . 14 00
Lake Superior Charcoal	... . 15 50
Southern Soft No. 1	... . 11 75
Hanging Rock Charcoal	... . 17 00
ST. LOUIS:	
Southern Coke No 1	$10 50@$10 75
Southern Coke No. 2	... . 10 25
Southern Coke No. 3	9 75@ 10 00
Southern Gray Forge	... . 9 75
Southern Charcoal No. 1	... . 12 50
Missouri Bessemer	... . 12 00
Ohio Softeners	... . 14 00
Lake Superior Car Wheel	... . 13 50
Southern Car Wheel	... . 13 25

OLD RAILS AND SCRAP METAL.

[Delivered Cleveland.]	GROSS TONS
Old iron rails	$14 00
Old steel rails (6 ft. and over)	9 50
Old steel rails (6 ft. and under)	9 50
Old car wheels	11 00
	NET TONS
No. 1 R. R. wrought scrap	$10 50
Mill scrap	8 00
No. 1 Machine cast scrap	8 00
Iron axles	15 00
Axle turnings	8 00
Wrought turnings (free from cast)	6 00
Cast borings	5 25
Uncut wrought iron boilers	4 00
Steel boiler plates	8 00
Grate bars	5 00
Pipes and flues (clean)	7 50
Tank iron	8 00
Hoop and band iron	6 50
Sheet iron	5 00
Wrought drillings	6 00
Malleable iron	8 50

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. Cleveland)	1.20c
Angles	1.10c
Tees	1.25c
Universal Plates	1.10@1.15c
Sheared Plates	1.20c

MERCHANT IRON AND STEEL.

[Less than car-lots, Cleveland.]

Rounds and Squares.—Bar Iron.

1 to 1⅞	1.00 Base.
2 to 2¾	.20 extra.
3 to 3½	.50 "
3¾ to 4	.80 "
4¼ to 4½	1.00 "
4¾ to 5	1.30 "
5¼ to 6	1.80 "
6¼ to 6½	2 30 "

6⅝ to 7¼	2.50 extra.
¾ to ⅞	.10 "
⅝ to 11-16	.20 "
⅛ to 9-16	.30 "
7-16 to 15-32	.40 "
⅜ to 13-32	.50 "
5-16 to 11-32	.70 "
¼ to 9-32	.90 "
7-32	1.40 "
3-16	2.50 "

Flats.—Bar Iron.

1⅛ to 4 x ⅜ to 1	1.05 Base.
4¼ to 6 x ⅜ to 1	.10 extra
6¼ to 8 x ⅜ to 1	.60 "
8¼ to 10 x ⅜ to 1	.80 "
1⅜ to 4 x 1 1-16 to 1½	.30 "
4¼ to 6 x 1 1-16 to 1½	.40 "
6¼ to 8 x 1 1-16 to 1½	.60 "
8¼ to 10 x 1 1-16 to 1⅝	.90 "
2 to 4 x 1⅝ to 2	.50 "
4¼ to 6 x 1⅝ to 2	.60 "
6¼ to 8 x 1⅝ to 2	.80 "
8¼ to 10 x 1⅝ to 2	1.00 "
2 to 4 x 2⅛ to 3	.60 "
4¼ to 6 x 2⅛ to 3	.80 "
6¼ to 8 x 2⅛ to 3	1.00 "
1⅛ to 1¾ x ⅜ to 1	.10 "
1 to 1 1-16 x ⅜ to ⅞	.20 "
¾ to 15-16 x ⅜ to ¾	.40 "
⅝ to 11-16 x ⅜ to ⅞	.50 "
⅛ to 9-16 x ⅜ to ⅝	.90 "

Heavy Band Iron.

7 to 10 x ¼ to 5-16	.70 extra.
6¼ to 6¾ x ¼ to 5-16	.50 "
4¼ to 6 x ¼ to 5-16	.30 "
1⅛ to 4 x ¼ to 5-16	.20 "
1 to 1⅜ x ¼ to 5-16	.30 "
¾ to 15-16 x ¼ to 5-16	.50 "
⅝ to 11-16 x ¼ to 5-16	.80 "
½ to 9-16 x ¼ to 5-16	1.00 "
⅜ to 7-16 x ¼ to 5-16	1.50 "

Heavy bands, 7-32 in. thick 1-10 c. per lb. higher than ¼ to 5-16 thick. **Bevel Edge Shaft Iron** 1-10 higher than same size of Heavy Bands.

Light Band Iron.

to 8 x No. 9 to 3-16	.90 extra.
7 to 8 x Nos. 10, 11 and 12	1.00 "
6¼ to 6¾ x No. 9 to 3-16	.70 "
6¼ to 6¾ x Nos. 10, 11 and 12	.80 "
4¼ to 6 x No. 9 to 3-16	.50 "
4¼ to 6 x Nos. 10, 11 and 12	.60 "
1¼ to 4 x No. 9 to 3-16	.40 "
1¼ to 4 x Nos. 10, 11 and 12	.50 "
1 to 1 3-16 x No. 9 to 3-16	.50 "
1 to 1 3-16 x Nos. 10, 11 and 12	.60 "
13-16 to ⅞ x No. 9 to 3-16	60 "
13-16 to ⅞ x Nos. 10, 11 and 12	.70 "
11-16 to ¾ x No. 9 to 3-16	.80 "
11-16 to ¾ x Nos. 10, 11 and 12	.90 "
9-16 to ⅝ x No. 9 to 3-16	1.00 "
9-16 to ⅝ x Nos. 10, 11 and 12	1.10 "
7-16 to ½ x No. 9 to 3-16	1.30 "
7-16 to ½ x Nos. 10, 11 and 12	1.40
⅜ x No. 9 to 3-16	1.50
⅜ x Nos. 10, 11 and 12	1.60

Bevel Edge Box Iron.

Same as Light Bands, of same sizes.

Beaded Band Iron, 1¼ in. to 2 in.

Sand Band Iron, 1-10 c. above same sizes of Light Bands.

Oval Iron.

⅞ to 1½	.40 extra.
¾ to 13-16	.50 "
⅝ to 11-16	.60 "
½ to 9-16	.80 "
⅜ to 7-16	1.10 "
½ to 9-16 x 3-16	1.00 "
⅝ to 11-16 x ⅛	1.20 "

Half Oval and Half Round.

2¼ to 3	.60 extra.
⅞ to 2	.50 "
¾ to 13-16	.70 "
⅝ to 11-16	.90 "
½ to 9-16	1.20 "
⅜ to 7-16	2.50 "
5-16	3.50 "
¼	4 50 "

Half Ovals less than ¼ their width in thickness, extra price.

Horse Shoe Iron.

All sizes 1 c. extra.

Cutting ordinary bars to specified length, .20 to .30 extra, according to length and size.

Steel Bands.

Width In Inches.	English Standard Gauge.		
1 1-2 to 6,	Nos. 7, 8, 9 or 3-16"	1.50	Base.
		Extras.	
1⅛ to 6,	" 10, 11, 12 or ¼"	.05 per 100 lbs.	
1 to 1⅜,	" 7, 8, 9 or 3-16"	.10	"
1 to 1⅜,	" 10, 11, 12 or ¼"	.15	"
13-16 and ⅞,	" 7, 8, 9 or 3-16"	.20	"
13-16 and ⅞,	" 10, 11, 12 or ¼"	.25	"
11-16 and ¾,	" 7, 8, 9 or 3-16"	.30	"
11-16 and ¾,	" 10, 11, 12 or ¼"	.35	"
9-16 and ⅝,	" 7, 8, 9 or 3-16"	.40	"
9-16 and ⅝,	" 10. 11, 12 or ¼"	.45	"
½,	Nos. 7, 8, 9 or 3-16"	.55	"
½,	" 10, 11, 12 or ¼"	.60	"
7-16	" 7, 8, 9 or 3-16"	.75	"
7-19	" 10, 11, 12 or ¼"	.85	"
⅜,	" 7, 8, 9 or 3-16"	.95	"
⅜,	" 10, 11, 12 or ¼"	1.05	"

Iron and Steel Hoops.

Width in Inches.	English Standard Gauge.		
1 7-16 to 3	Nos. 13, 14, 15 and 16	1.60	Base.
		Extras	
1 7-16 to 2,	" 17, 18, and 19	.05 per 100 lbs.	
1 7-16 to 2,	" 20	.10	"
17-16 to 2,	" 21	.15	"
1 7-16 to 1¾,	" 22	.25	"
1 ⅝ to 1⅜,	" 13, 14 and 15	.05	"
1¾ to 1¾,	" 16, 17 and 18	.10	"

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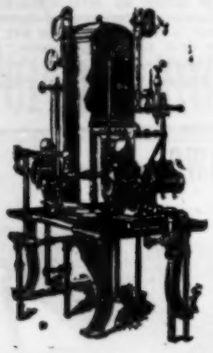

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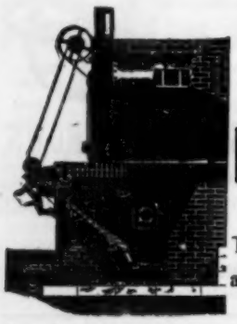

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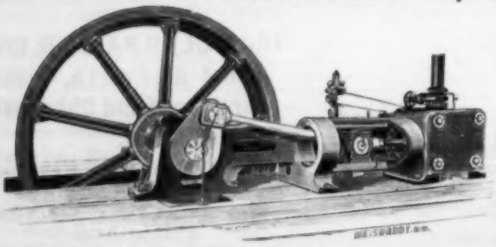

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1⅛ to 1⅜,	" 19 and 20	.15 per 100 lbs.
1⅛ to 1⅜,	" 21	.30 "
1⅛ to 1⅜,	" 22	.30 "
15-16 and 1,	" 13, 14 and 15	.10 "
15-16 and 1,	" 16, 17 and 18	.15 "
15-16 and 1,	" 19 and 20	.20 "
15-16 and 1,	" 21	.25 "
15-16 and 1,	" 22	.35 "
⅞,	Nos. 13, 14 and 15	.20 "
⅞,	" 16, 17 and 18	.25 "
⅞,	" 19 and 20	.30 "
⅞,	" 21	.35 "
⅞,	" 22	.45 "
¾ and 13-16	Nos. 13, 14 and 15	.30 "
¾ and 13-16	" 16, 17 and 18	.35 "
¾ and 13-16	" 19 and 20	.40 "
¾ and 13-16	" 21	.45 "
¾ and 13-16	" 22	.50 "
¾ and 13-16	" 23	.60 "
11-16,	Nos. 13, 14 and 15	.35 "
11-16,	" 16, 17 and 18	.40 "
11-16,	" 19 and 20	.50 "
11-16,	" 21	.60 "
11-16,	" 22	.70 "
11-16,	" 23	.80 "
⅝,	Nos. 13, 14 and 15	.40 "
⅝,	" 16, 17 and 18	.45 "
⅝,	" 19 and 20	.55 "
⅝,	" 21	.65 "
⅝,	" 22	.75 "
⅝,	" 23	.85 "
9-16,	" 13, 14 and 15	.45 "
9-16,	" 16, 17 and 18	.50 "
9-16,	" 19 and 20	.60 "
9-16,	" 21	.70 "
9-16,	" 22	.80 "
9-16,	" 23	.90 "
½,	" 13, 14 and 15	.55 "
½,	" 16, 17 and 18	.60 "
½,	" 19 and 20	.70 "
½,	" 21	.80 "
½,	" 22	.90 "
½,	" 23	1.00 "
7-16,	" 13, 14 and 15	.80 "
7-16,	" 16, 17 and 18	.90 "
7-16,	" 19 and 20	1.00 "
⅜,	" 13, 14 and 15	1.00 "
⅜,	" 16, 17 and 18	1.10 "
⅜,	" 19 and 20	1.20 "

Sheet Iron.

No. 10	1 50
No. 12	1 70
No. 14	1 60
No. 15-17	1 75
No. 18	1 85
No. 20	2 00
No. 22-24	2
No. 25-26	2 20
No. 27	2 30

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	13c

Steel Boiler Plates—1-4 in. and Heavier.

Tank	1 35
Shell	1 45
Flange	1 55
Marine Flange	1 60
Fire Box	2 05

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. lb. extra
96 to 100 in. wide	1c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special.

Flats.

	cts. lbs.
2 to 9-16 in. wide by 2 to ⅝ thick	.08

Bessemer and O. H. Steel.

Bessemer Machinery	base price,	1 40
Open-hearth Tire	"	1 45
Open-hearth Spring	"	1 80
Sleigh Shoe	"	1 45
Toe Calk	"	1 90
Cutter Shoes, tapered and bent	"	1 60

American Cast Tool Steel.

ROUND, SQUARE, AND OCTAGON.	cts. lbs.
1 to 2 in. inclusive	.08
9-16 to ⅞ in. "	.08
7-16 to ⅝ and 2⅜ to 3 in	.09
3⅛ to 4 in	.09½
⅝ to 11-16 and 4½	.10
⅛ to 6 in	.10½
¼ to 9-32 and 6⅛ to 7 in	.11
1 in	.13

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 00
Bridge ½, ⅝, 11-16 and ¾ inch diam	2 55

Wrought Pipe and Boiler Tubes.

Lap weld black, base, and 10 per cent	.78
Butt " " " "	.72
Lap " galv. " "	.70
Butt " " " "	.67
Boiler tubes 2¼" and smaller	.72½
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Wright's	₩ lb 12

Bellows.

Blacksmiths'	Hill's	dis 40
	Bullock's	dis 50&10
Moulders'		dis 40@40&10
Hand		dis 40&10@50

Rivets.

Iron, Thousand, list November 1, 1894.....dis 60@65
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894.....dis 60@65
Copper.....dis 50@50&10

Taps.

Cards, Hand and Nut to 2 in.....dis 50
Carpenters' " " " .....dis 50
Morse " " " .....dis 50
Pratt & Whitney " " new list.....dis 10
Machine Screw Taps.....dis 55
Pipe Taps to 2½ in.....dis 70
Stay Bolt Taps.....dis 25
Stove Bolt Taps.....dis 55
Pulley Taps.....dis 40

Vises.

Solid Box.....dis 60
Parker's.....dis 20@25
Prentiss.....dis 20
Stephen's.....dis 25@30
Barrett's.....dis 30
Miller's Falls.....dis 40
Merrill's.....dis 15@20
Howard.....dis 35

Wire.

New List, Apr. 9, 1894

Brass.....dis 35
Copper.....dis 35
Bright and annealed, Nos. 0@18.....dis 70&10@75
" " Nos. 19@26.....dis 75@75& 5
" " Nos. 27@36.....dis 75&10& 5
Coppered Nos. 0 to 18, market list.....dis 70@70& 5
Galvanized Nos. 0 to 18 " " .....dis65& 5
Tinned market Nos. 0 to 18.....dis 67½
Cast steel.....dis 50
Tinned Broom Wire.....dis 70&5@70&10
Annealed Fence, Nos. 8 and 9.....dis 75
Annealed Grape, Nos. 10 to 14.....dis 75
Stub's Steel Wire regular.....95c ℔ dis 30

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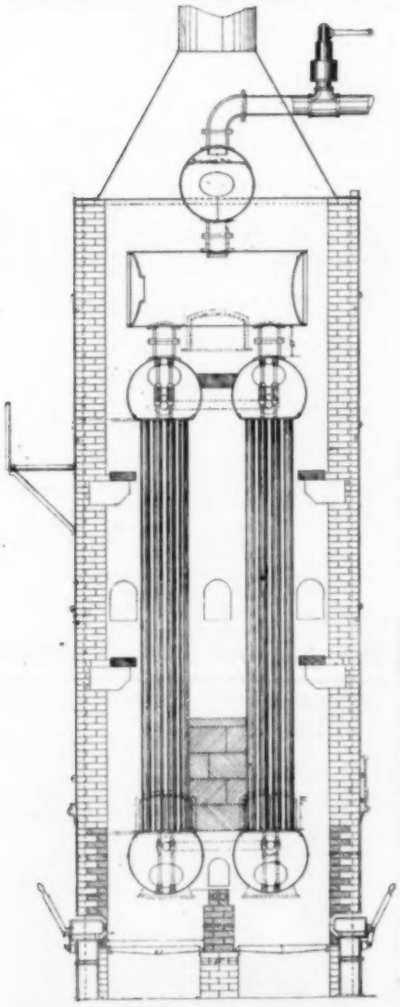

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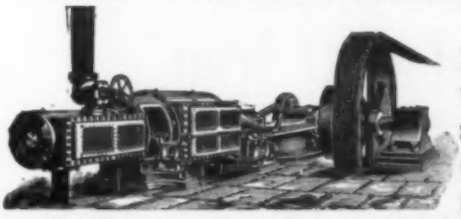

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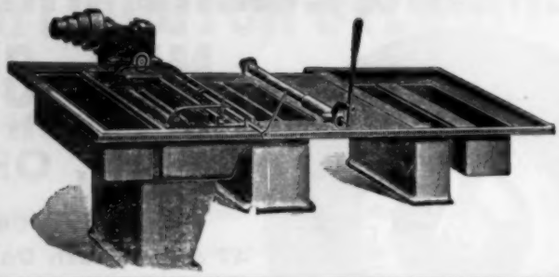

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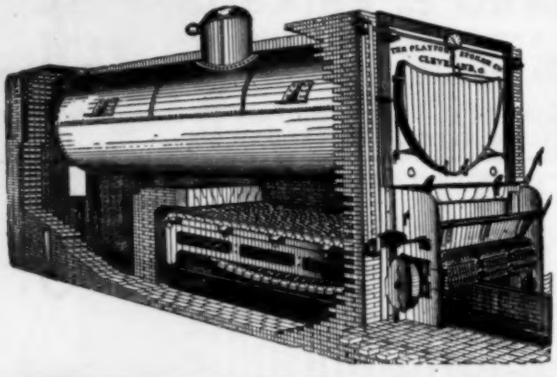

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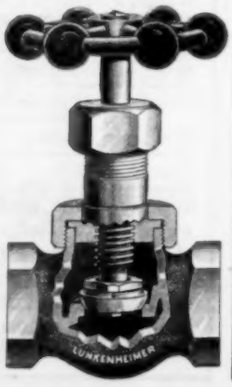

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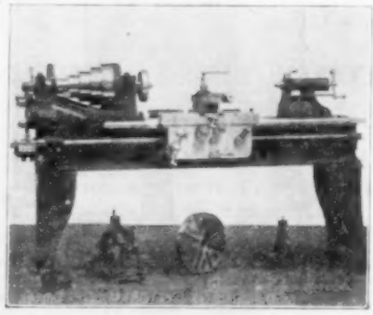

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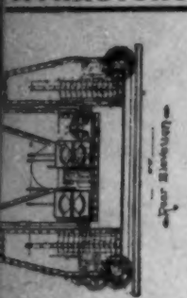

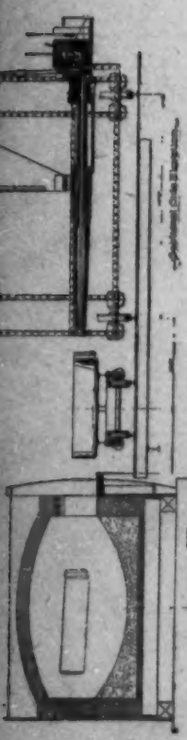

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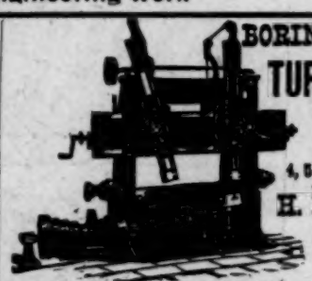

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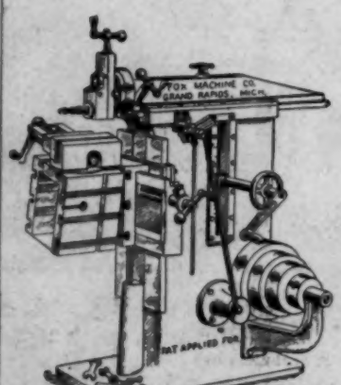

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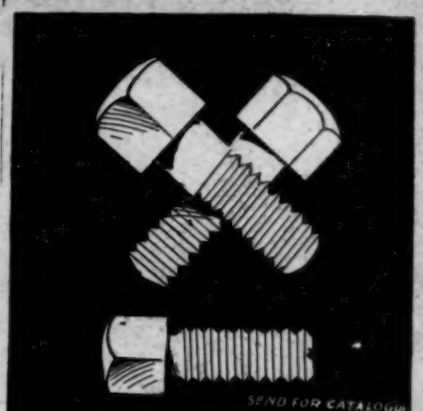

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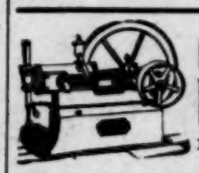

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